ARCADIAN

VOL 2. Number 5

March 24, 1980

BALLY/FIDELITY have stopped negotiations as of about the first of March. Apparently there were four or five items on which they could not reach agreement and so Bally is again looking for a buyer.

WELL, that puts us back to December with regard to an Add-On, and we are doing some rethinking, again, about it. Hopefully more next time.

PROJECT ONE is proceeding on schedule, and barring unforseen difficulties, should be available by August.

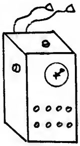
BALLY/TRS-80 INTERFACE is being worked on, with up to 4K RAM.I'm interested in hearing from those who will have use for this.

FIFTH WEST COAST COMPUTER FAIRE was held last weekend, up in San Francisco. SEBREE's COMPUTING had a booth there, ably manned by Tim Hays. Tim had a couple of TV's going showing his products, and the new handcontroller. One machine had a talking machine added to it (Speak'N'Spell type). Tim reported that he was still working on the light pen and the ultrasonic generator (for actuation of external devices).

PRINTER by XYMEC has been advertised as workable with the Bally, but I have not checked it out because it costs $2800. in serial form, and I didn't have enough petty cash...

LIGHT PEN diagrams have turned up here, now and then, but no one has yet come up with a reliable scheme that is not affected by noise or ambient light.

HAND CONTROLLER by Tim Hays. SEBREE's is marketing Tim's hand controller system. Actually, the box (3½x6x2) contains two sets of controller functions. The two rows of buttons across the bottom generate the JX and JY commands; the buttons on the side and top provide TR, and the joystick will give the KN. (One KN is horizontal movement, the other KN is vertical movement.) Component used are high-quality micro-switch pushbuttons, and the joystick is similar to ones used in radio-controls for airplanes,etc. I mentioned that my joystick had all the possible KN values(-128 to 127) at the center of the available sweep and Tim acknowledged that different resistors would be installed on the production models.



TV MONITOR printed in the last issue has been operated by a couple of subscribers, but a question of safety has come up that perhaps I should have mentioned before. The TV to be used must have an isolated chassis, preferably with a transformer power supply. An alternative would be to use opto-isolators in the circuit. Monitors are usually 'safe', but one should check the monitor input against the 110v wall socket with a voltmeter.

NEAR FAILURE was reported by a subscriber who had bad results with setting &(9)=-42 Lots of screen garbage, but no way to get rid of it, including unplugging from the wall socket. After 'resting' for a couple of hours, he set &(9)=30 and a reset, and it seemed to go back to normal - for a day.

NEW BOOKS recommended by one of our more knowledgeable subscribers for those who want to delve into the operation of the Bally's microprocessor. These should be available at radio/electronics stores, computer shops, or directly from the publisher, Howard W. Sams & Co., 4300 West 62nd St. Indianapolis, IN 46268

#21634 Crash Course on Microprocessing ($17.50)
#21609 & #21610, Z80 Microprocessor Interfacing & Programming, Vol I & II (21.95set)

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MEMORY TUTORIAL II

ROM (or Read Only Memory) as mentioned before, is an accumulation of memory locations that can be read only, not changed in any way, and is generally used to store permanent Operating Systems, games, instructions, etc. These are manufactured at some factory and usually provided with a purchased computer. The Bally games are on individual ROMs. The ROM is analogous to a phonograph record, fixed.

It became evident that it would be very appealing if one could make his own ROM, starting with an empty set of memory locations, filling them up with a program one wanted to keep, and making it permanent. So the PROM, or PROGRAMMABLE ROM was developed. With this system, the empty PROM is placed in a "PROM BURNER", and the program data entered in machine language. The program is first entered by hand into a RAM and checked out to see that it is correct. Then each byte of data is sequentially entered into its proper address in the PROM and a "burn" current is applied for a very small fraction of a second, 'setting' the data permanently. A new address is called, the proper byte of data entered, the current applied, etc., etc. It might take two minutes or so to load 8K of memory. The PROM is then analogous to a tape cassette recording with the little tab on the back removed to make erasure impossible.

A later development was the EPROM, or ERASABLE PROM, which allows the home user to reinstate the empty status of all the address locations by exposing the window in the top of the EPROM to ultraviolet light for a short period of time. This 'heals' all the burnt connections of the EPROM. This is analogous to using a bulk eraser on a tape cassette recording.

PROGRAMS in this issue:

O-JELLO by Clyde Perkins is a version of Othello. The object is to have as many of your pieces on the board as possible. Your play is to 'capture' as many of the opponent's pieces as possible - this converts them to your pieces. (Of course, it works the other way, too.) You do this by placing a piece (with the hand controller joystick) in a spot adjacent to the opponent's, where his is now sandwiched between two of yours - press the trigger.

2000 AD by Ed Larkin is a shoot-em-up between an alien invader ship an a ground station. Use the knob to aim, the trigger to fire, and the joystick to move about. After five points use TR(1) to restart.

BIORYTHM by Dave Walter is a version that stores the data for the three graphs outside the program in string locations, and then directs their printing in the proper place on the screen. The sine wave is therefore quite accurately portrayed. In addition, it is fast moving. To load the string data, load this on tape and save before the program is manually loaded:

```
10 FOR A=0 TO 86
20 PRINT #1,"@(",A,")=",
30 INPUT @(A)
40 NEXT A
```

After punching in the program load the string from the tape. The program is now complete. Dump to tape as follows: `:PRINT;LIST;FOR A=0 TO 86;PRINT #1, "@(",A,")=", @(A); NEXT A; PRINT "CLEAR;RUN`
Then load back to Bally and the program will be selfstarting.

AN INDEX TO VOLUME I is included in this issue. For those of you who do not have this historical document(?), it is available at $10.ppd.

CATALOG OF ESOTERIC SOFTWARE is offerred by Anderson Research. This free item includes cryptography, chess, sports car rallying & operational programs such as the sample on p. 39. See their ad on the back page.

LETTERING in different formats is always of interest, as we can liven up programs with unique presentations. The following program provides you with two versions of lower case, from Anderson Research.

```
  1 .ARCADIAN SAMPLER-A.R.D.
  10 CLEAR ;S=0;J=40;A=17996
  20 FOR B=1TO 8;GOSUB J+B;%(A)=C;%(A+40)=D;%(A+80)=E;%(A+120)=F;%(A+160)=G;%(A+
200)=H;%(A+240)=I;A=A+2;NEXT B
  25 S=S+1
  30 J=50;A=18316;IF S=2STOP
  40 GOTO 20
  41 C=0;D=0;E=170;F=2;G=170;H=130;I=170;RETURN
  42 C=0;D=0;E=170;F=130;G=128;H=128;I=128;RETURN
  43 C=0;D=0;E=170;F=130;G=128;H=130;I=170;RETURN
  44 GOSUB 41;RETURN
  45 C=2;D=2;E=170;F=130;G=130;H=130;I=170;RETURN
  46 C=32;D=0;E=32;F=32;G=32;H=32;I=32;RETURN
  47 GOSUB 41;RETURN
  48 C=0;D=0;E=170;F=130;G=130;H=130;I=130;RETURN
  51 C=0;D=0;E=44;F=130;G=42;H=130;I=170;RETURN
  52 C=0;D=0;E=44;F=130;G=128;H=128;I=128;RETURN
  53 C=0;D=0;E=44;F=130;G=128;H=130;I=44;RETURN
  54 GOSUB 51;RETURN
  55 C=2;D=2;E=42;F=130;G=130;H=130;I=42;RETURN
  56 C=32;D=0;E=32;F=32;G=32;H=32;I=32;RETURN
  57 GOSUB 51;RETURN
  58 C=0;D=0;E=136;F=162;G=130;H=130;I=130;RETURN
```

WHILE this one from Tim Hays adds some sound effects. He wonders if you can figure out what it does by just looking at it. You can get letters 5x normal size.

```
  1 CLEAR ;.WEIRD! - BY TIM HAYS
  10 @(1)=97;@(2)=87;@(3)=73;@(4)=69;@(5)=82;@(6)=68;@(7)=33
  20 INPUT "LETTER SIZE?"L;CLEAR ;BC=0;FC=134;&(10)=140;CY=-30;FOR A=1TO 7;TV=@(
A);NEXT A
  30 &(16)=100;&(21)=79;&(22)=255
  40 NT=0;FOR X=-80TO 160cL-80;FOR Y=-33TO -27
  50 IF PX(X,Y)BOX (X+81)bL-79,(Y+30)bL,L,L,1
  60 D=RND (3)+16;&(D)=RND (150)+10
  70 NEXT Y;NEXT X
  80 BOX -59,-30,42,9,2;&(10)=174;&(22)=0;&(21)=0
>
```

SAUCER BATTLE CORRECTION (p.2) requires the completion of the BOX command in line 920. There should be a 2 in the space just before ;NEXT P This was a goof on my part for not completing a correction.

SPACE WAR CORRECTION? (p.31) was just brought to my attention, but I don't have the answer as yet. Line 130 appears to be missing - I haven't had a chance to talk to the author yet. This is one of the subtle problems in program checking, you may never hit the circumstance that requires a particular subroutine or branch while you are doing a check - but someone else does. (I did check the donated program, of course.)

INDEX to Vol 1

ABSOLUTE VALUE COMMAND 10
ABS() COMMANDS 10
ASCII CODE 16
BALLY ARTICLE 28
BASIC -ZGRASS 11
BOX 4
CALCULATOR ACCESS 9
CALCULATOR ACCESS 32
CALL 10
CALLS - MENU 31
CASSETTE - COMMANDS 18
CASSETTE - COMMANDS 30
CASSETTE - INTERFACE 17
CASSETTE - INTERFACE 20
CASSETTE - INTERFACE SPEED UP 80
CHARACTER SIZE 50
COLOR VALUES 58
COLOR - FOUR 9
COMMANDS - CALL 10
COMMANDS - CALL 25
COMMANDS - CASSETTE 18
COMMANDS - CASSETTE 30
COMMANDS - MUSIC 30
COMMANDS - PRINT #N 33
COMMANDS - ZGRASS 37
COMPUTER COMPARISONS 22
CONTROL COMMANDS 4
CONTROL COMMANDS 6
CONTROL COMMANDS 10
CONTROL COMMANDS 15
CONTROL COMMANDS 18
CONTROL COMMANDS 19
CONTROL COMMANDS 33
DATA STORAGE - TUTORIAL 41
DECIMALS 18
DECIMALS 24
DECIMALS 25
DECIMALS 32
DICTIONARY 82
DICTIONARY - COMMANDS 19
DISC 4
EXTERNAL FUNCTIONS 26
FORMATTING 33
GAME OVER - PRINTED 25
HACKERS MANUAL 31
IF 55
IF - TUTORIAL 41
IF - TUTORIAL #2 51
INPUTS 30
INPUTS- DOUBLING 55
INTERCONNECTION - DIRECT 27
INTERCONNECTION - DIRECT 31
INTERFACE 4
INTERFACE - CASSETTE 17
INTERFACE - CASSETTE 20
INTERFACE - CASSETTE SPEED UP 80
INTERFACE - MEMORY 27
JOYSTICK 5
JOYSTICK 9
KEYBOARD 47
KEYBOARD ADDON 85
KEYPAD INPUTS 30
KEYPAD SUBSTITUTE 76
LANGUAGE - ZGRASS 11
LARGE LETTERS 25
LARGE LETTERS 45
LARGE LETTERS 47
LARGE LETTERS 69
LINE 4
MEMORY ADDRESSING - TUTORIAL 87
MEMORY MAP 34
MENU - CALLING 31
MENU - CALLING 39
MODEM - TELEPHONE 18
MODEM - TELEPHONE 58
MODEM - TELEPHONE 88
MODIFICATION - POWER INDICATOR 88
MONITORING 26
MUSIC 62
MUSIC 71
MUSIC - COMMANDS 30
MUSIC - FREQUENCIES 69
MUSIC - MULTIPLE NOTES 6
MUSIC - THREE TONE 9
MUSIC SYNTHESIZER - TUTORIAL 62
MUSIC SYNTHESIZER - TUTORIAL #2 71
NOTE TIME 34
POKEING 75
POWER INDICATOR MODIFICATION 88
PRINT LOCATION 60
PRINTER 47
PRINTING IN QUOTATIONS 25
PRINTING - LARGE LETTERS 25
PRINTING - LARGE LETTERS 45
PRINTING - LARGE LETTERS 69
PROGRAM - JOYSTICK OPERATION 9
PROGRAM - LIST CHARACTERS 16
PROGRAM "amazed in space" 60
PROGRAM "bangman" 48
PROGRAM "bangman" correction 70
PROGRAM "bangman" modification 58
PROGRAM "black box" 74
PROGRAM "black box" correction 77
PROGRAM "checkers" 41
PROGRAM "checkers" 42
PROGRAM "checkers" correction 47
PROGRAM "checkers" correction 90
PROGRAM "checkers" modification 77
PROGRAM "clock" 85
PROGRAM "distance between 2 points" 67
PROGRAM "frequencies" 70
PROGRAM "hex to decimal" 36
PROGRAM "memory contents-hex" 44
PROGRAM "memory display" 67
PROGRAM "memory dump" 43
PROGRAM "microtrek" 38
PROGRAM "poking" 75
PROGRAM "random art" 44
PROGRAM "random art" expanded 49
PROGRAM "resequencing" 90
PROGRAM "reverse" 38
PROGRAM "reverse" corrections 46
PROGRAM "simon" 35
PROGRAM "simon" corrections 45
PROGRAM "simon" corrections 77
PROGRAM "slot machine" 59
PROGRAM "slot machine" correction 69
PROGRAM "slot machine" modification 77
PROGRAM "sound graph" 65
PROGRAM "space war" 79
PROGRAM "square root" 67
PROGRAM "touch tone" 65
PROGRAMS - SELF STARTING 41
PROGRAMMING - TUTORIAL 56
PX FUNCTION - TUTORIAL 81
QUOTATION PRINTING 25
REFERENCE BOOKS 68
REFERENCE LITERATURE 23
REFERENCE LITERATURE 25
REFERENCE LITERATURE 31
REVIEW PROGRAMS 86
RM - COMMANDS 18
RS-232 CONNECTOR 26
RS-232 CONNECTOR 30
RS-232 SOURCE 18
SCREEN COLOR 9
SCREEN COLOR 58
SCREEN DISPLAY - CHARACTERS 50
SCREEN GRID 17
SCREEN LOCATION 50
SCREEN OPERATIONS 5
SCREEN OPERATIONS 15
SCREEN OPERATIONS - TUTORIAL 40
SELF STARTING PROGRAMS 41
SERIAL NUMBERS 77
SERVICE MANUAL 16
SOUND SYNTHESIZER - TUTORIAL 62
SOUND SYNTHESIZER - TUTORIAL #2 71
SOUNDS 6
SPACE SAVER 34
SPECIFICATIONS 21
SPECIFICATIONS 23
SPECIFICATIONS 25
STRINGS 10
SUBROUTINES - TUTORIAL 72
SYMBOLS 39
TECHNICAL DATA 7
TEXT AREA - TUTORIAL 78
TUTORIAL - BEGINNERS 56
TUTORIAL - DATA STORAGE 41
TUTORIAL - IF 41
TUTORIAL - IF #2 51
TUTORIAL - MEMORY ADDRESSING 87
TUTORIAL - MUSIC SYNTHESIZER 62
TUTORIAL - MUSIC SYNTHESIZER #2 71
TUTORIAL - PROGRAMMING 56
TUTORIAL - PX FUNCTION 81
TUTORIAL - SCREEN OPERATIONS 40
TUTORIAL - SOUND SYNTHESIZER 62
TUTORIAL - SOUND SYNTHESIZER #2 71
TUTORIAL - SUBROUTINES 72
TUTORIAL - TEXT AREA 78

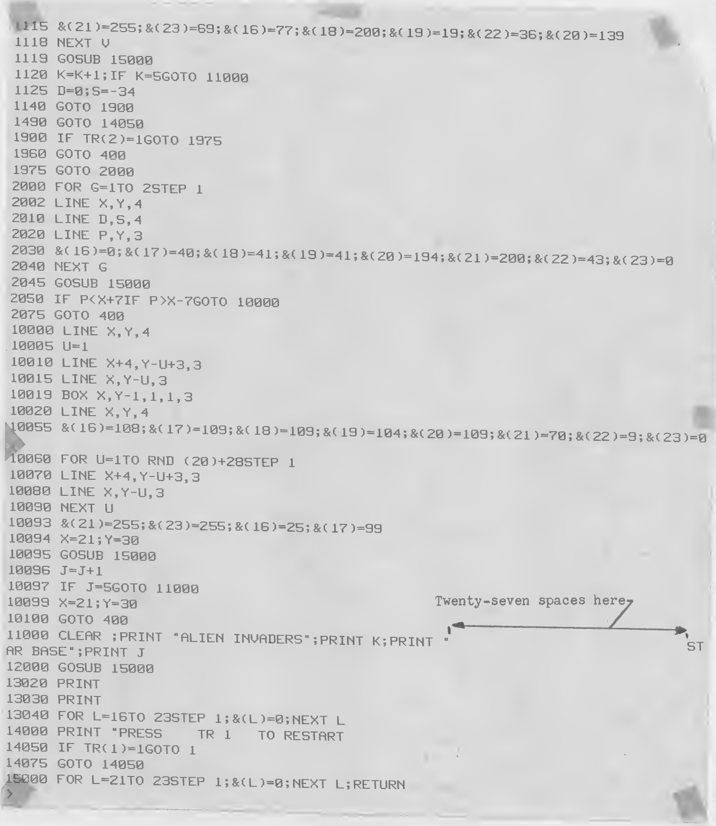
```
  5 .   O-JELLO
  6 . BY CLYDE PERKINS
  8 :RETURN ;CLEAR ;INPUT " HOW MANY PLAYERS ?"I;I=I-1
 10 :RETURN ;CLEAR ;FOR N=-4TO 4;BOX Nb10,0,1,73,1;BOX 0,Nb9,81,1,1;NEXT N;@(0)
=-1;@(1)=-1
 20 FOR P=1TO 2;A=120bP-181;B=10;GOSUB 370;FOR B=-4TO 5STEP 9;A=(Pb2-3)bBcABS(B
)b5;GOSUB 370;NEXT B;NEXT P;IF I P=1;GOTO 60
 30 @(2)=3;@(3)=5;@(4)=1;@(5)=8;@(7)=9;@(8)=0;@(9)=15;@(12)=-15;@(13)=2;@(17)=9
9
 40 FOR X=0TO 3;FOR Y=0TO X;FOR Z=2TO 50STEP 16;FOR W=1TO 4STEP 3
 50 @(XbW+Yb(5-W)+Z)=@(X+Yb4+2);NEXT W;NEXT Z;NEXT Y;NEXT X;P=1
 60 GOSUB 180;E=0;F=0;GOSUB 120;GOSUB 410
 70 BOX E,F,3,3,3;G=E;H=F;E=E+JX(P)b3;F=F+JY(P)b3;BOX G,H,3,3,3;IF TR(P)=0GOTO
70
 80 X=(G+90)c10b10-85;Y=(H+90)c9b9-85;IF (ABS(X)>35)+(ABS(Y)>32)GOTO 140
 90 IF PX(X+3,Y)GOTO 110
100 S=-10;GOSUB 210;IF Q P=(P=1)+1;GOSUB 180;GOTO 150-90b(I#0)
110 GOSUB 130;PRINT "OOPS",;FOR N=0TO 1000;NEXT N;GOSUB 120;GOTO 70
120 GOSUB 130;BOX CX+9,CY,27,9,2;RETURN
130 CX=120bP-189;CY=0;NT=3;RETURN
140 GOSUB 130;PRINT "PASS",;GOSUB 170;P=2-(P#1);IF (P=1)+(I#0)GOTO 60
150 P=2;GOSUB 410;GOSUB 200;P=2;IF V#0X=C;Y=D;S=-10;GOSUB 210;P=1;GOTO 420
160 GOTO 140
170 IF PX(-69,0)=PX(51,0)GOTO 190
180 IF @(0)+@(1)#64RETURN
190 BOX 0,0,59,17,2;CX=-23;CY=0;PRINT "GAME OVER",;I=KP-49;RUN
200 P=0;V=0;FOR Y=32TO -31STEP -9;S=0;FOR X=-35TO 35STEP 10;M=10;IF PX(X+3,Y)M=
-10;GOTO 240
210 Q=0;FOR U=X+STO X+10STEP 10;FOR W=Y-9TO Y+9STEP 9;IF PX(U+3,W)IF PX(U,W)=(P
=1)GOTO 250
220 NEXT W;NEXT U;IF PRETURN
230 IF Q A=X;B=Y;GOSUB 390;Q=Q+R;IF V<Q V=Q+RND (9)-7;C=X;D=Y
240 S=M;NEXT X;NEXT Y;RETURN
250 Z=0;IF U<XGOTO 270
260 IF M>=U-X M=U-X-10
270 GOSUB 400;MU=RND (26)+64;A=X;B=Y;FOR L=1TO 8;A=A+U-X;B=B+W-Y;IF PX(A+3,B)=0
GOSUB 400;GOTO 220
280 IF PX(A,B)=(P#1)GOTO 320
290 IF P=0GOSUB 390;Z=Z+R;NEXT L
300 IF ZGOSUB 360
310 NEXT L
320 IF P=0Q=Q+Z+99b(Q=0);GOSUB 400;GOTO 220
330 IF ZGOTO 220
340 IF Q=0A=X;B=Y;GOSUB 370
350 Z=1;Q=1;GOTO 270
360 T=2-P;N=-1;BOX A,B,7,6,2;GOSUB 380
370 T=P-1;N=1;FOR E=3TO 7STEP 2;BOX A,B,E,9-E,3;NEXT E;BOX A,B,2bP+1,2bP,3-P;NT
=3;MU=90-Pb4
380 CX=120bT-63;CY=20;@(T)=@(T)+N;NT=0;PRINT #2,@(T),;RETURN
390 O=ABS(B)c9b4+ABS(A)c10+2+32b(B<0)+16b(A<0);R=@(O);RETURN
400 BOX X,Y,3,2,(P=0)b3;RETURN
410 BOX 0,-40,160,7,2;GOSUB 120;CY=-40;PRINT " ↑",;RETURN
420 GOSUB 180;FOR B=-31TO 32STEP 63;FOR A=-35TO 35STEP 70;IF PX(A,B)GOSUB 390;@
(O-5)=0
430 NEXT A;NEXT B;GOTO 60
```

2000 AD by Ed Larkin

```
    1 CLEAR ;BC=0
    2 PRINT "2000 AD";FC=127;FOR E=1TO 1000STEP 2;NEXT E
    3 CLEAR ;FC=0
   10 NT=0;K=0;J=0;B=RND (2)
   15 GOTO 70
   20 BOX 0,-22,160,1,1
   30 BOX 0,-9,160,1,1
   40 BOX 0,0,160,1,1
   50 BOX 0,6,160,1,1
   60 BOX 0,8,42,1,1;BOX 50,8,40,1,1;BOX -50,8,40,1,1
   65 GOTO 365
   70 LINE 39,6,4;LINE 79,-6,3;LINE 24,6,4
  100 LINE 79,-29,3;LINE 9,6,4;LINE 55,-44,3;LINE 4,6,4
  150 LINE 20,-44,3;LINE 0,6,4;LINE -20,-44,3
  170 LINE -5,6,4
  180 LINE -60,-44,3
  190 LINE -15,6,4
  200 LINE -80,-28,3
  210 LINE -30,6,4
  220 LINE -80,-6,3
  250 LINE -80,14,4;LINE -39,35,3;LINE 0,18,3;LINE 48,41,3
  290 LINE 79,24,3
  295 GOTO 20
  365 FOR T=1TO 180STEP 1;&(10)=T;BC=0;FC=30;NEXT T
  400 Q=8;BC=0;FC=30;&(22)=0
  408 X=X+JX(1)bQ
  410 Y=Y+JY(1)bQ
  411 IF X>79X=72
  414 IF X<-79X=-72
  416 IF Y>42Y=38
  418 IF Y<-42Y=-38
  420 BOX X,Y,6,1,3;BOX X,Y+1,3,1,3;BOX X,Y,6,1,3;BOX X,Y+1,3,1,3
  435 Q=10
  440 D=D+JX(2)bQ
  450 S=S+JY(2)bQ
  452 IF D>79D=75
  454 IF D<-79D=-75
  456 IF S<-41S=-38
  458 IF S>6S=5
  460 BOX D,S,3,3,3;BOX D,S,3,3,3
  480 LINE X,Y,4
  490 H=(KN(1)c16)b10+4
  495 P=(KN(2)c16)b10
  700 IF TR(1)=1GOTO 950
  800 IF TR(2)=1GOTO 1900
  900 GOTO 400
  950 &(16)=18;&(17)=17;&(18)=17;&(19)=14;&(20)=65;&(21)=140;&(22)=151;&(23)=0
 1000 FOR F=1TO 2STEP 1
 1010 LINE -(H),S,3;LINE X,Y,4;NEXT F
 1015 GOSUB 15000
 1050 H=-(H)
 1052 IF H<D+6IF H>D-6GOTO 1100
 1060 GOTO 1900
 1100 FOR V=1TO 8STEP 1
 1105 LINE D,S,4
 1110 LINE D+RND (6),S+RND (4),3;LINE D+RND (6),S+RND (4),3
```

(continued)
p 43

(2066 continued)



```
1115 &(21)=255;&(23)=69;&(16)=77;&(18)=200;&(19)=19;&(22)=36;&(20)=139
1118 NEXT V
1119 GOSUB 15000
1120 K=K+1;IF K=5GOTO 11000
1125 D=0;S=-34
1140 GOTO 1900
1490 GOTO 14050
1900 IF TR(2)=1GOTO 1975
1960 GOTO 400
1975 GOTO 2000
2000 FOR G=1TO 2STEP 1
2002 LINE X,Y,4
2010 LINE D,S,4
2020 LINE P,Y,3
2030 &(16)=0;&(17)=40;&(18)=41;&(19)=41;&(20)=194;&(21)=200;&(22)=43;&(23)=0
2040 NEXT G
2045 GOSUB 15000
2050 IF P<X+7IF P>X-7GOTO 10000
2075 GOTO 400
10000 LINE X,Y,4
10005 U=1
10010 LINE X+4,Y-U+3,3
10015 LINE X,Y-U,3
10019 BOX X,Y-1,1,1,3
10020 LINE X,Y,4
10055 &(16)=108;&(17)=109;&(18)=109;&(19)=104;&(20)=109;&(21)=70;&(22)=9;&(23)=0

10060 FOR U=1TO RND (20)+28STEP 1
10070 LINE X+4,Y-U+3,3
10080 LINE X,Y-U,3
10090 NEXT U
10093 &(21)=255;&(23)=255;&(16)=25;&(17)=99
10094 X=21;Y=30
10095 GOSUB 15000
10096 J=J+1
10097 IF J=5GOTO 11000
10099 X=21;Y=30
10100 GOTO 400
11000 CLEAR ;PRINT "ALIEN INVADERS";PRINT K;PRINT "                           ST
AR BASE";PRINT J
12000 GOSUB 15000
13020 PRINT
13030 PRINT
13040 FOR L=16TO 23STEP 1;&(L)=0;NEXT L
14000 PRINT "PRESS    TR 1   TO RESTART
14050 IF TR(1)=1GOTO 1
14075 GOTO 14050
15000 FOR L=21TO 23STEP 1;&(L)=0;NEXT L;RETURN
>
```

Twenty-seven spaces here

```
 10 :RETURN ;CLEAR ;NT=0;&(9)=60;BC=249;FC=116
 30 CY=12;CX=-30;PRINT "BIO-RYTHYMS
 40 CY=-36;PRINT "   REVISED 1/80 D. WALTER"
 50 NT=10;FOR A=0TO 86;MU=@(A);NEXT A;NT=1;GOTO 200
 100 FOR A=1TO 3000;NT=1
 110 IF KP GOTO 200
 130 NEXT A;BC=1;GOTO 100
 190 CY=0;INPUT "MONTH"M,"DAY"D,"YEAR"Y
 192 IF D>0IF D<32IF M>0IF M<13RETURN
 200 CLEAR ;&(9)=60;BC=250;FC=7
 210 CY=24;PRINT "  WHAT IS YOUR BIRTHDATE"
 220 PRINT "MONTH,DAY,YEAR,EX-6/10/62"
 240 CY=0;GOSUB 190
 250 U=D;V=M;W=Y;BC=176
 260 CY=24;PRINT "WHAT IS TODAY'S DATE      "
 270 BOX -60,-8,41,28,2;CY=0;GOSUB 190
 280 FOR A=0TO 86;NT=3;MU=A;NEXT A
 290 Q=Y-W;K=V;L=M
 295 IF V>M K=M;IF V>M L=V
 300 T=Qb365+Qc4
 302 IF K=LGOTO 360
 305 IF V>M T=-T
 310 FOR R=KTO L-1
 320 T=T+30
 330 IF R#2IF R#4IF R#6IF R#9IF R#11 T=T+1
 340 IF R=2 T=T-2
 350 NEXT R
 360 T=ABS(T)-(U-D)
 370 P=Tc23;P=RM
 380 E=Tc28;E=RM+24
 390 I=Tc33;I=RM+53
 400 CLEAR ;FC=1;BC=125;NT=0;PRINT
 415 PRINT "YOU HAVE LIVED",#6,T," DAYS.
 420 CY=22
 430 PRINT "PHYSICAL INDEX:",#9,@(P)
 440 CY=11;X=@(P);GOSUB 1000
 450 CY=-2
 460 PRINT "EMOTIONAL INDEX:",#8,@(E)
 470 CY=-12;X=@(E);GOSUB 1000
 490 CY=-26;PRINT "INTELLECTUAL INDEX:",#5,@(I)
 500 CY=-36;X=@(I);GOSUB 1000
 510 FOR Z=0TO 3000;NEXT Z;CLEAR
 525 CY=0;CX=-70;&(9)=-1;FC=117;BC=240
 530 PRINT "CYCLES: THE NEXT 25 DAYS"
 535 FOR A=0TO 1000;NEXT A;CLEAR ;&(10)=0;BC=0;FC=118
 537 &(0)=179;&(1)=179;&(2)=FC;&(3)=FC;GOSUB 1100;&(9)=199;FOR A=0TO 180;&(10)=A
;NEXT A;NT=3
 540 CX=-75;CY=@(P);PRINT "P",;GOSUB 750
 550 CX=-68;CY=@(E);PRINT "E",;GOSUB 750
 560 CX=-61;CY=@(I);PRINT "I",;GOSUB 750
 610 LINE -72,@(P),0;A=P;B=23;C=0
 630 GOSUB 800
 640 LINE -65,@(E),0;A=E;B=52;C=24
 660 GOSUB 800
 670 LINE -58,@(I),0;A=I;B=86;C=53
 690 GOSUB 800
 695 NT=3;GOTO 100
 750 BOX CX-7,CY,7,9,3
```

(continued on p. 45)

(BIORYTHMS continued)

```
 770 RETURN
 800 FOR X=-52TO 75STEP 5
 810 &(17)=255
 816 &(22)=15;&(16)=72-@(A)
 820 LINE X,@(A),1
 830 A=A+1;IF A=B A=C
 840 NEXT X;&(22)=0;RETURN
1000 IF X>13PRINT "HIGH"
1010 IF X>=-13IF X<13PRINT " CRITICAL!!!";BOX -43,CY+8,75,11,3
1020 IF X<-13PRINT "LOW"
1030 RETURN
1100 BOX -50,0,1,80,1;U=0;BOX 15,0,129,1,1
1105 L=0
1110 FOR X=-50TO 75STEP 5;BOX X,0,1,3,1
1120 U=U+1
1125 IF U=7GOSUB 1150
1130 NEXT X;RETURN
1150 BOX X,0,1,10,1;L=L+7;CX=X-3;CY=-40;PRINT #1,L,;U=0
1160 U=0;RETURN
@(0)=0
@(1)=10
@(2)=19
@(3)=26
@(4)=32
@(5)=35
@(6)=36
@(7)=34
@(8)=29
@(9)=23
@(10)=14
@(11)=5
@(12)=-5
@(13)=-14
@(14)=-23
@(15)=-29
@(16)=-34
@(17)=-36
@(18)=-35
@(19)=-32
@(20)=-26
@(21)=-19
@(22)=-10
@(23)=0
@(24)=0
@(25)=8
@(26)=16
@(27)=22
@(28)=28
@(29)=32
@(30)=35
@(31)=36
@(32)=35
@(33)=32
@(34)=28
@(35)=22
@(36)=16
@(37)=8
@(38)=0
@(39)=-8
@(40)=-16
@(41)=-22
@(42)=-28
@(43)=-32
@(44)=-35
@(45)=-36
@(46)=-35
@(47)=-32
@(48)=-28
@(49)=-22
@(50)=-16
@(51)=-8
@(52)=0
@(53)=0
@(54)=7
@(55)=13
@(56)=19
@(57)=25
@(58)=29
@(59)=33
@(60)=35
@(61)=36
@(62)=36
@(63)=34
@(64)=31
@(65)=27
@(66)=22
@(67)=16
@(68)=10
@(69)=3
@(70)=-3
@(71)=-10
@(72)=-16
@(73)=-22
@(74)=-27
@(75)=-31
@(76)=-34
@(77)=-36
@(78)=-36
@(79)=-35
@(80)=-33
@(81)=-29
@(82)=-25
@(83)=-19
@(84)=-13
@(85)=-7
@(86)=0
&(10)=176;RUN
>
```

ADS

- I would like to purchase RED BARON, LETTER MATCH, and MATH cartridges. Ray Sarwinski 2655 Soderblom Ave. San Diego CA 92122 714-453-5520

- FOR SALE Like new Bally Arcade with STAR BATTLE, BLACKJACK, CLOWNS, BASEBALL, PANZER ATTACK, SEAWOLF, Z80 ZZAP, FOOTBALL, BASIC & cassette interface - a bargain at $375 or best offer. Hal Schmidt 10568 Porto Ct San Diego, CA 92124 714-571-1485

- COMPUTER EAR is a speech recognition device comparable to Heuristics SPEECHLAB and RShack VOXBOX, but at one-third the price, at $59.95 ppd. Additional info from Anderson Research & Design. 1611 Lacota Lane, Burnsville, MN 55337 612-894-2633 (note, we are in the process of reviewing one of these now)

SALVAGE Bally printed circuit boards source has been located. While negotiations are still underway, it seems like we will be able to provide a fully stuffed, unused board for $25. BUT. They are SALVAGE from the production line, and therefore have problems - but they also have lots of usable parts. First off, the problems are mostly mechanical (poor connections, solder spillage, etc.) or the problem could be a bad chip. The $25 rate is for a pot-luck, Hobson's choice, as-is board. We also expect to receive diagnostic equipment with this cache of goodies and should be able to do some error-correction, therefore making it possible to provide operating boards, at a higher price - to be determined. The current price of a Z-80 chip is $10.95, and the custom chips are $20-30 each, so a board has considerable parts value as well as potential for experimenters, etc. Also, if you will write in with specific questions about a board that you purchased, we will attempt to answer the problem since we will have had some repair experience by then, and we will use the ARCADIAN as a means of dissemination. If you have any interest in one or a batch (price will get better with reduced shipping charges), let me know.

Forty-six

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25.

As a not too experienced programmer, I have utilized a number of means to solve problems in my own programs and in the published ones I get thru Arcadian. This rather obvioue approach might be use ful to readers.

Lets say that the computer epits out a HOW? Then it lists line 460 or whatever and sticks a question mark in there somewhere. The question the user has to ask ie WHY did it do that?

1. Often it is a math error. That is, it doeen't know the answer to such things as dividing by zero. Neither do we, and we can say it ie infinite--which is eomething the computer doesnt understand. Anything divided by zero is undefined. It wants to know how...

   The other math error is one which produces a number that is larger than a+ or - 32767. Which is the biggeet thing that the computer can normally handle.

   DONT EVER FORGET THAT THE COMPUTER JUST HANDLES NUMBERS.

2. On the subroutines(GOSUB) and on the go someplace else(GOTO) the computer spits out a HOW if it can't go there. On the computed GOSUB'e and GOTO's, it is eimple to find out if there is something there. Usually there is nothing there, so it can't go there.

3. Essentially, then--there are the following possibilities.
   1. You have a forbidden mathematical operation.
      - A. You are trying to divide by zero. thats a no-no.
      - B. You have obtained a number too big for Bally to compute (in Absolute value), greater than +32767 and that is a no-no. (yes, dividing by zero makes too big a number, also--like, its infinite, and that is big...) Really 0 divided by 0 is undefined. You cant get something for nothing.
   2. You have tried to send the computer to a place it can't go.

Lete suppose that you have run along just fine and the computer asks How?. THEN IT LISTS A PARTICULAR LINE AND INSERTS A QUESTION MARK.

There will be eome Variables in that line. Study it. See if indeed you are multiplying or dividing. Or going somewhere. Suppose it is an (((Mx10)+20+E)+X)?or anything else. By golly, you have a computer, use it. Tell the computer Print M, E, X (In somecases List 460, 1)

And it will.

Say M is 0 , E ie 0 and X is 10. Well you can inspect the above and say the crash occured when you tried to divide 20 by zero.

all right? All computer crashes will occur in that type of situation. You cant use too big a number, you cant divide by zero, and if it is supposed to go somewhere... well see if there is any thing there to go to. I uee the Print (Mx10), E, 20/E, X etc to get some idea of what numbers the program and the computer are dealing with. Also, If I missed some thing, I List, 1 etc. Remember, you can also put in GOTO 430 or whatever anytime you need to. After a game, and if I missed some stats or I want to check something out, I just pop in a GOTO.

The key is to remember that the computer uses numbers and that there are some numbers that are too big or not allowed.

The making of sense out of a mistake is a bit harder. But again, just reason the thing out and have some idea of what you think is supposed to happen. The computer is a tool. Since we can use the tool, use it. When your tool doeen't work, use your head. You'll be surprised how that works out.

2p.

Biorythms by Dave Walter, is another version ~~of this favorite~~ that strategies stores the 3 graphs in storing locations and then directs their printing in the proper place on the screen. By using this technique, the sine wave can be fairly accurately depicted. In addition it operates quite quickly.

discuss loading the @ pr his instructions

49 ÷ 4 = 12

5-11-30 : 1930 5/20

6	30
7	31
8	31
9	30
10	31
11	30
12	31
	234

80
−31
49 × 365 = 17885
234
12
LY:
To March 14 = 31
29
14
74

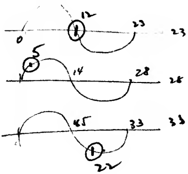
[illegible]

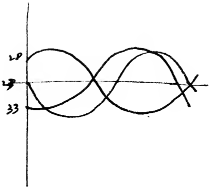
18205 to Mar 14.

÷ 23 = 791.52 .52 × 23 = ⑫

÷ 28 = 650.178 ⑤

÷ 33 = 551.66 (22)





call Houser on Anderson COMPUTER EAR

call

Ed Mulholland 28659 on K/B - actually working?

Jerry Tindle 78758

Ad

Bill Goodrich

[redacted]

ARCADIAN - VOLUME I

INDEX

ABS COMMAND 10
ADD-ON (EXPANSION) 1,9,17,21,23,25,28,31,45,54,55,69,77,84
ADVERTISEMENTS 33,46,54,68,75,76,84,92
"AMAZED IN SPACE" 58,60,61
& (PORT) (SEE ASSOCIATED FUNCTION)
ARCADIAN 1,9,53,84,85
ASSEMBLY LANGUAGE 16,25,45,47
(MACHINE LANGUAGE)
"BANGMAN" 47-9,58,70
BASIC 4,7,8,10,17,23,25,39,40,53,55-8,72,78,82-3,87
BILBRAY, BRETT 35-6,38-9
"BLACK BOX" 69,74
CALCULATOR (S) 10,19,24,32
CALL COMMAND 10,19,25
CARTRIDGES 1,16,17,23,31,53,85
'CHAIN STORE AGE' 28
CHARACTERS 50-2,72
"CHECKERS" 41-2,47,90
"CLOCK" 36
COLLINS, JOHN 41
COLOR STANDARDS 47,58
COMMANDS (SEE COMMAND NAME)
COMPARITIVE ANALYSIS 22
COMPATIBLE EQUIPMENT 1,27,47,55
CONNECTOR 47
CONSUMER ELECTRONICS SHOW 17,28
CONTROLLER (JOYSTICK) 5,7,9,10,26
CONVERSION (HEX-DEC) 36
DIVISION 24,34
EXPANSION MODULE (SEE ADD-ON)
FABRIS, ROBERT 1,6,10,16,17,30,38,46,54,68,76,84,92
GAMES (SEE NAME OF GAME)
"GAME OVER" 25,45
"GIANT LETTERS" 45,47,69
GOTO COMMAND 18
GRAPHICS 4,5,6,7,9,15,17,39,40,43,47,58
GROUP MEETINGS 91
HACKERS MANUAL 24,31,34
HOOD, ROBERT 69,70
HEX-DECIMAL CONVERSION 36
IBACH, D. 77-9
INTERCONNECTION 27,31
JOYSTICK 5,7,9,10,26
KEYPAD 5,7,9,30,47,77,85
LAW, PAUL 24
MACHINE LANGUAGE 16,25,45,47
MANUALS (SEE MANUAL NAME)
MEMORY 1,4,9,17,21,23,24,25,27,34,40,43,87
"MEMORY DISPLAY" 67
"MEMORY DUMP" 43,44
MENU 31,39
"MICROTREK" 88-9
MODEM 18,58,88
MUSIC 6,9,23,30,62-6,69,71,73
NT 34
PEEK/POKE 4,75
POWER ON 88

PRINT FORMATS 18,24,33,50-2,55
PROGRAMMING SHEETS 58
PROJECTS 4,25,33,39,47,54,55,77
PX 81
"RANDOM ART" 44,49
REANY, B. 69,74
"RESEQUENCING" 85,90-1
"REVERSE" 38-9,46
REVIEWS 76,77,85,86
RM 18
ROM 23-4,34
RUN 18-9
SAMS, ERNIE 44,47,59,70
SEMINARS 39
SERIAL NUMBERS 77
SERVICE MANUAL 16,23,85
"SIMON" 35,39,45
"SLOT MACHINE" 59,77
SOFTWARE 16,24-5,33,35-6,38-45,75
"SOUND GRAPH" 65
"SPACE WAR" 79
"SQUARE ROOT" 67
STOCKER, DAVID 67
STOP COMMAND 19
SURVEY 55,69
TAPE I/O 4,7,17,18,20,30,34
THOMKA, CHUCK 34,43,58,65,67,69,71
"TOUCH TONE" 65
TUTORIALS 39-41,50-2,56-8,62-6,71-3,78-9
UNROE, JIM 27,31
VENDORS 1,2,3,9,10,18,27,28,30,31,39,45,53,68,75,85,90
WALTERS, STEVE 81
WOOD, TOM 19,25
XY 19
ZGRASS 11-4,24,28,37,55

Cursor

ARCADIAN - VOLUME I
INDEX

ABS COMMAND	10
ADD-ON (EXPANSION)	1,9,17,21,23,25,28,31,45,54,55,69,77,84
ADVERTISEMENTS	33,46,54,68,75,76,84,92
"AMAZED IN SPACE"	58,60,61
& (PORT)	(SEE ASSOCIATED FUNCTION)
ARCADIAN	1,9,53,84,85
ASSEMBLY LANGUAGE (MACHINE LANGUAGE)	16,25,45,47
"BANGMAN"	47-9,58,70
BASIC	4,7,8,10,17,23,25,39,40,53,55-8,72,78,82-3,87
BILBRAY, BRETT	35-6,38-9
"BLACK BOX"	69,74
CALCULATOR ($)	10,19,24,32
CALL COMMAND	10,19,25
CARTRIDGES	1,16,17,23,31,53,85
'CHAIN STORE AGE'	28
CHARACTERS	50-2,72
"CHECKERS"	41-2,47,90
"CLOCK"	36
COLLINS, JOHN	41
COLOR STANDARDS	47,58
COMMANDS	(SEE COMMAND NAME)
COMPARITIVE ANALYSIS	22
COMPATIBLE EQUIPMENT	1,27,47,55
CONNECTOR	47
CONSUMER ELECTRONICS SHOW	17,28
CONTROLLER (JOYSTICK)	5,7,9,10,26
CONVERSION (HEX-DEC)	36
DIVISION	24,34
EXPANSION MODULE	(SEE ADD-ON)
FABRIS, ROBERT	1,6,10,16,17,30,38,46,54,68,76,84,92
GAMES	(SEE NAME OF GAME)
"GAME OVER"	25,45
"GIANT LETTERS"	45,47,69
GOTO COMMAND	18
GRAPHICS	4,5,6,7,9,15,17,39,40,43,47,58
GROUP MEETINGS	91
HACKERS MANUAL	24,31,34
HOOD, ROBERT	69,70
HEX-DECIMAL CONVERSION	36
IBACH, D.	77-9
INTERCONNECTION	27,31
JOYSTICK	5,7,9,10,26
KEYPAD	5,7,9,30,47,77,85
LAW, PAUL	24
MACHINE LANGUAGE	16,25,45,47
MANUALS	(SEE MANUAL NAME)
MEMORY	1,4,9,17,21,23,24,25,27,34,40,43,87
"MEMORY DISPLAY"	67
"MEMORY DUMP"	43,44
MENU	31,39
"MICROTREK"	88-9
MODEM	18,58,88
MUSIC	6,9,23,30,62-6,69,71,73
NT	34
PEEK/POKE	4,75
POWER ON	88

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PRINT FORMATS	18,24,33,50-2,55
PROGRAMMING SHEETS	58
PROJECTS	4,25,33,39,47,54,55,77
PX	81
"RANDOM ART"	44,49
REANY, B.	69,74
"RESEQUENCING"	85,90-1
"REVERSE"	38-9,46
REVIEWS	76,77,85,86
RM	18
ROM	23-4,34
RUN	16-9
SAMS, ERNIE	44,47,59,70
SEMINARS	39
SERIAL NUMBERS	77
SERVICE MANUAL	16,23,85
"SIMON"	35,39,45
"SLOT MACHINE"	59,77
SOFTWARE	16,24-5,33,35-6,38-45,75
"SOUND GRAPH"	65
"SPACE WAR"	79
"SQUARE ROOT"	67
STOCKER, DAVID	67
STOP COMMAND	19
SURVEY	55,69
TAPE I/O	4,7,17,18,20,30,34
THOMKA, CHUCK	34,43,58,65,67,69,71
"TOUCH TONE"	65
TUTORIALS	39-41,50-2,56-8,62-6,71-3,76-9
UNROE, JIM	27,31
VENDORS	1,2,3,9,10,18,27,28,30,31,39,45,53,68,75,85,90
WALTERS, STEVE	81
WOOD, TOM	19,25
XY	19
ZGRASS	11-4,24,28,37,55

ABSOLUTE VALUE COMMAND 10
ABS() COMMANDS 10
ASCII CODE 16
BALLY ARTICLE 28
BASIC -ZGRASS 11
BOX 4
CALCULATOR ACCESS 9
CALCULATOR ACCESS 32
CALL 10
CALLS - MENU 31
CASSETTE - COMMANDS 18
CASSETTE - COMMANDS 30
CASSETTE - INTERFACE 17
CASSETTE - INTERFACE 20
CASSETTE - INTERFACE SPEED UP 80
CHARACTER SIZE 50
COLOR VALUES 58
COLOR - FOUR 9
COMMANDS - CALL 10
COMMANDS - CALL 25
COMMANDS - CASSETTE 18
COMMANDS - CASSETTE 30
COMMANDS - MUSIC 30
COMMANDS - PRINT #N 33
COMMANDS - ZGRASS 37
COMPUTER COMPARISONS 22
CONTROL COMMANDS 4
CONTROL COMMANDS 6
CONTROL COMMANDS 10
CONTROL COMMANDS 15
CONTROL COMMANDS 18
CONTROL COMMANDS 19
CONTROL COMMANDS 33
DATA STORAGE - TUTORIAL 41
DECIMALS 18
DECIMALS 24
DECIMALS 25
DECIMALS 32
DICTIONARY 82
DICTIONARY - COMMANDS 19
DISC 4
EXTERNAL FUNCTIONS 26
FORMATTING 33
GAME OVER - PRINTED 25
HACKERS MANUAL 31
IF 55
IF - TUTORIAL 41
IF - TUTORIAL #2 51
INPUTS 30
INPUTS- DOUBLING 55
INTERCONNECTION - DIRECT 27
INTERCONNECTION - DIRECT 31
INTERFACE 4
INTERFACE - CASSETTE 17
INTERFACE - CASSETTE 20
INTERFACE - CASSETTE SPEED UP 80
INTERFACE - MEMORY 27
JOYSTICK 5
JOYSTICK 9
KEYBOARD 47
KEYBOARD ADDON 85
KEYPAD INPUTS 30
KEYPAD SUBSTITUTE 76
LANGUAGE - ZGRASS 11
LARGE LETTERS 25
LARGE LETTERS 45
LARGE LETTERS 47
LARGE LETTERS 69
LINE 4
MEMORY ADDRESSING - TUTORIAL 87
MEMORY MAP 34
MENU - CALLING 31
MENU - CALLING 39
MODEM - TELEPHONE 18
MODEM - TELEPHONE 58
MODEM - TELEPHONE 88
MODIFICATION - POWER INDICATOR 88
MONITORING 26
MUSIC 62
MUSIC 71
MUSIC - COMMANDS 30
MUSIC - FREQUENCIES 69
MUSIC - MULTIPLE NOTES 6
MUSIC - THREE TONE 9
MUSIC SYNTHESIZER - TUTORIAL 62
MUSIC SYNTHESIZER - TUTORIAL #2 71
NOTE TIME 34
POKEING 75
POWER INDICATOR MODIFICATION 88

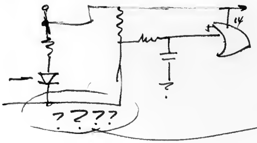
PRINT LOCATION 50
PRINTER 47
PRINTING IN QUOTATIONS 25
PRINTING - LARGE LETTERS 25
PRINTING - LARGE LETTERS 45
PRINTING - LARGE LETTERS 69
PROGRAM - JOYSTICK OPERATION 9
PROGRAM - LIST CHARACTERS 16
PROGRAM "amazed in space" 60
PROGRAM "bangman" 48
PROGRAM "bangman" correction 70
PROGRAM "bangman" modification 58
PROGRAM "black box" 74
PROGRAM "black box" correction 77
PROGRAM "checkers" 41
PROGRAM "checkers" 42
PROGRAM "checkers" correction 47
PROGRAM "checkers" correction 90
PROGRAM "checkers" modification 77
PROGRAM "clock" 35
PROGRAM "distance between 2 points" 67
PROGRAM "frequencies" 70
PROGRAM "hex to decimal" 36
PROGRAM "memory contents-hex" 44
PROGRAM "memory display" 67
PROGRAM "memory dump" 43
PROGRAM "microtrek" 88
PROGRAM "poking" 75
PROGRAM "random art" 44
PROGRAM "random art" expanded 49
PROGRAM "resequencing" 90
PROGRAM "reverse" 38
PROGRAM "reverse" corrections 46
PROGRAM "simon" 35
PROGRAM "simon" corrections 45
PROGRAM "simon" corrections 77
PROGRAM "slot machine" 59
PROGRAM "slot machine" correction 69
PROGRAM "slot machine" modification 77
PROGRAM "sound graph" 65
PROGRAM "space war" 79
PROGRAM "square root" 67
PROGRAM "touch tone" 65
PROGRAMS - SELF STARTING 41
PROGRAMMING - TUTORIAL 56
PX FUNCTION - TUTORIAL 81
QUOTATION PRINTING 25
REFERENCE BOOKS 68
REFERENCE LITERATURE 23
REFERENCE LITERATURE 25
REFERENCE LITERATURE 31
REVIEW PROGRAMS 86
RM - COMMANDS 18
RS-232 CONNECTOR 26
RS-232 CONNECTOR 30
RS-232 SOURCE 18
SCREEN COLOR 9
SCREEN COLOR 58
SCREEN DISPLAY - CHARACTERS 50
SCREEN GRID 17
SCREEN LOCATION 50
SCREEN OPERATIONS 5
SCREEN OPERATIONS 15
SCREEN OPERATIONS - TUTORIAL 40
SELF STARTING PROGRAMS 41
SERIAL NUMBERS 77
SERVICE MANUAL 16
SOUND SYNTHESIZER - TUTORIAL 62
SOUND SYNTHESIZER - TUTORIAL #2 71
SOUNDS 6
SPACE SAVER 34
SPECIFICATIONS 21
SPECIFICATIONS 23
SPECIFICATIONS 25
STRINGS 10
SUBROUTINES - TUTORIAL 72
SYMBOLS 39
TECHNICAL DATA 7
TEXT AREA - TUTORIAL 78
TUTORIAL - BEGINNERS 56
TUTORIAL - DATA STORAGE 41
TUTORIAL - IF 41
TUTORIAL - IF #2 51
TUTORIAL - MEMORY ADDRESSING 87
TUTORIAL - MUSIC SYNTHESIZER 62
TUTORIAL - MUSIC SYNTHESIZER #2 71
TUTORIAL - PROGRAMMING 56
TUTORIAL - PX FUNCTION 81
TUTORIAL - SCREEN OPERATIONS 40
TUTORIAL - SOUND SYNTHESIZER 62
TUTORIAL - SOUND SYNTHESIZER #2 71
TUTORIAL - SUBROUTINES 72
TUTORIAL - TEXT AREA 78

Dear Clyde Rakins

First off - thanks for the program you sent, plus the telephone interface schematic. I plan to punch the program in the next wk, and I'd like to get the circuit in as soon as I can. ~~but~~ First I'd like to try out the circuit myself, ~~I would like~~ duplicating your operation as closely as possible - what opto isolators and transistors did you use? Has the coupler portion been debugged ~~[illegible]~~ yet? ~~The~~ control circuit segment - where is the tie made that goes to the Cassette Interface 4-5D? ~~ground~~

not sent yet

I don't understand the



2/27

Dear George Bozdog

Finally(!) located an 74LS165 here in the midst of Silicone Valley, so now I have all parts to make up a prototype of your keyboard interface. I'd like to get that up and running before putting the diagram in the newsletter.

Did pages 69-76 get to you yet?

Now reviewing a speech recognition system being commercially produced - you will be able to say a word or two to the Bally + have something happen.

Keep you informed —

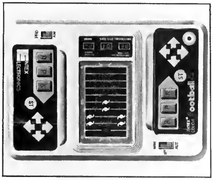
Bob

Not seen yet

2/5

Bradley, Parker Brothers and Atari was scheduled to introduce 1980 models at the February Toy Fair—also launched groundbreaking first-quarter game promotions at CES. "We started a very aggressive TV campaign for our Head To Head sports games and Quiz Whiz game running from January through March," said president Arnold Greenberg at the Coleco booth. "We have found that the first quarter is a very heavy buying period for games."

Vanity Fair will be at the Toy Fair with a new two-player basketball game, the Full Court Electronic Basketball, which will retail for about $30. The firm also is bringing out a desktop pinball game that projects light onto a screen and keeps score for up to four players. It will retail in the $50 range.



New entry from Entex.

Tiger expanded heavily into children's electronics at CES with its Hippo Lot-O-Fun, and its two-in-one handhelds: Football and Sea Chase, Safari and Darts, and Space Invader and Gone Fishin'. Also in the new line are Ditto, and Deluxe Football.

Entex is reaching toward higher price points with the introduction of a children's microcomputer, with 4K of memory and a keyboard, slated to retail in the $70 range. The company had no prototype at the show, but expects to be in production within a few months. The firm's new handheld line includes Color Football 4 (red and green teams), Baseball 3, Tennis, Basketball 2, Football 3 and Jackpot Gin Rummy. Its voice-activated Chuck Truck accepts up to 48 commands.

Bambino also has a new multicolored handheld in its line, the Superstar Football II, with a suggested retail of about $40, and July delivery. Other new games include Soccer, Ice Hockey and Space Laser Fight, all retailing for about $35.

Expanding its handheld line, Waddington introduced Soccer 2, Hockey 2, the Mini Game Machine and the Game Machine II. ☐

...But Programmables Show New Strength

There's life in the video programmable games industry yet—at least to judge by the prominent displays, stepped-up advertising and increased attention that the category garnered at Winter CES. Once thought to be headed in the same direction as dedicated video games, programmables are basking in the explosive boom affecting almost the entire video industry.

Much of that growth springs from cartridge sales, which are approaching the seven-to-one software-to-hardware sales ratio. And retailers shopping CES for new cartridges had an impressive array of new action and sports tapes from which to choose.

But software wasn't the only news at CES. In a long-expected move, Bally left the consumer games business, selling its consumer division to Fidelity Electronics. At presstime, the two companies had signed a memoranda of agreement. Once the agreement is final, Fidelity will acquire Bally's inventory, plus rights to produce consumer versions of current and future Bally coin-operated games.

Fidelity will market the game under the Fidelity brand, but may retain the Professional Arcade name used by Bally. The company may also bring out a less expensive version of the Arcade game, according to executive VP Myron Samole. "We're going to try to rework the size of the game and help drop the price," he said at CES.

Adventure games continued their dominance in the field, as Atari introduced such games as Space Invaders, Night Driver, Adventure, Circus Atari, 3-D and Golf. The games are slated to retail in the $20 to $27 range. "We plan to have 45 or 50 cartridges available by the end of 1980," says Atari's VP Bill Grubb.

The company will also launch a first-time-ever promotion on cartridges. "It's very profitable for the retailer to carry programmable video games," said Mike Moone, president of Atari's consumer division at the company's booth. "And not only the hardware, but the software. It's a classic demonstration of the razor and razor blade theory."

"We've had the most successful year so far with programmable games," said marketing manager for video games Tom Garvin at the Magnavox booth. "We were up about a third." Magnavox's new cartridges for its Odyssey 2 game include Pachinko, Volleyball, Football, Billiard, Slot Machine and War Chest, all retailing in the $20 range.

Fidelity VP Myron Samole.

Mattel also expanded its line of 14 cartridges for the Intellivision programmable game/low-end computer with six new cartridges. Its Soccer, Golf and Skiing tapes are licensed by the various professional sports associations.

Chess Talks A Good Game

Electronic chess was playing—as well as looking and talking—a good game at Winter CES as a steady stream of retailers filled booths during all the show's four days.

Chafitz introduced game cartridges for its Modular Game System, including a Sargon 2.5 chess program, Las Vegas Blackjack, Checkers and a word game. The company also introduced a less-expensive version of its Boris Diplomat with a larger LED display. The new Diplomat retails for $109.

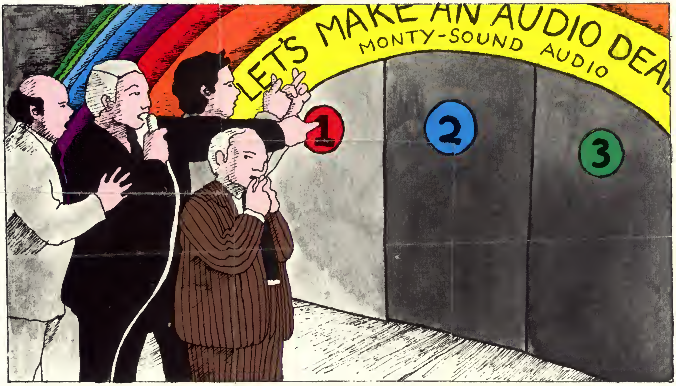
Board games became multilingual at CES as Fidelity added a second language option for an additional $50 to its $360 Voice Chess Challenger. For $75, the game will describe moves in two additional foreign tongues. Also new were a $130 Sensory Chess Challenger 8 and a Bridge Bidder Challenger for $200. ☐

AUDIO

CES Deals Don't Develop As Industry Tightens Belt

by George Kopp

R.Wo


LET'S MAKE AN AUDIO DEAL
MONTY-SOUND AUDIO
1
2
3

All talk, no action, but no doom and gloom, either. That's the consensus on what went on in the closing rooms at Vegas. But though few dotted lines got signed, the talks were substantive, and the action was expected to get hotter in the weeks following the show.

Despite rumors of dumps and deals that made the rounds before the show, dealers didn't see too many dumpers. After a rough year, both sides were playing their cards close to the vest. For their part, manufacturers brought out relatively few new products due to the shaky economy (see story, page 88).

Christmas sales were good, and dealers across the country said that they had their inventory positions where they wanted them—down—and they intended to keep them that way, at least as much as possible. The product categories that were strongest were the ones that did well last year—high-end and low-end systems, and cassette decks. More of a question mark are integrated amps and mid-priced receivers.

Garbage

"It's important," says Mark Phillips, president of Sound Advice in Miami, "to slow down your turn for the sake of a particular product at a particular price point. We're generally leaner than we were last year, but we'll still order big on $90 receivers, for example. Our goal is to get rid of the garbage."

In terms of their bargaining position retailers felt they were no better off than they have been in the past, but some felt they should be. Manufacturers' inventories are long, and dealers who feel they are in good financial positions also feel that the suppliers should give them a better break. Bill Kelly of Ohio's Tokyo Shapiro stores says suppliers are paying "more respect" to his chain than they once did, but he added he still wasn't offered the deals he expected. "There were some," he says. "Some were good, more were mediocre and some weren't there at all."

Kelly and Phillips both say that more aggressive marketing will be a key to success this year. To help things along, U.S. Pioneer has begun its National Truckload Sale, which continues through March.

Price Stability

VP Ken Kai says Pioneer will spend $2 million on TV advertising, backed up by an extensive print campaign, but adds that the sale will not be purely price-oriented. Kenwood marketing VP Don Palmquist predicts more price stability over the next few months, and dealers hope he is right.

As for a recession, there is now a feeling it won't happen. According to Sanyo's executive VP Bill Byron,

Continued on page 88

FEB 80

ref Ron Warren
Ki Cit 93930

MR. W. C. PERKINS
1004 Pleasant Ave.
Boyne City, MI 49712

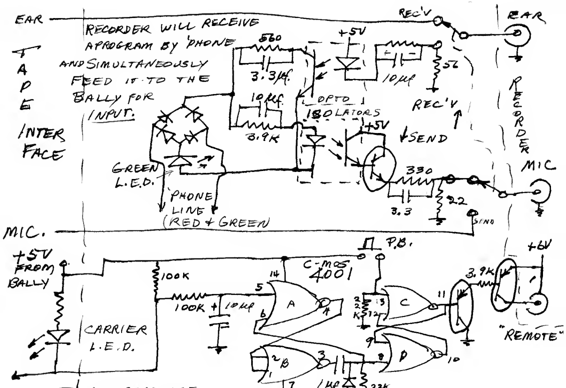
2/9/80

ROBERT FABRIS
SAN JOSE, CA.

DEAR BOB:

THIS IS MY FIRST CONTRIBUTION TO THE CAUSE. THE ARCADIAN (VOL. II - #3) CAME TOO LATE TO BE TABULATED FEB 6 BUT HERE ARE A FEW COMENTS ANYWAY. SINCE I'M MOSTLY RETIRED, LIVING ON SOC. SECURITY, MY GOALS DON'T INCLUDE ALL ITEMS IN THE POP. CONTEST. I WOULD LIST THEM IN THIS ORDER (PAGE 19) 9, 6, 7, 3, 10, 4, 7, 2, 12, 1, 8, 11, 13, 14.

THE SKETCH COMBINES A COUPLE OF BASIC IDEAS ON A COUPLE OF THESE. I USE A PORTABLE MONAURAL RECORDER WITH THE USUAL "REMOTE" JACK FOR TRANSCRIBING. THE TWO BIGGEST PROBLEMS ARE THESE: 1. THE TWO CORDS FROM THE TAPE INTERFACE MAY NOT BE PLUGGED INTO THE RECORDER AT THE SAME TIME WITHOUT FEED BACK PROBLEMS. 2. I CAN'T SEEM TO REMEMBER TO SHUT OFF THE TAPE WHEN THE PROGRAM RUNS. THIS CIRCUIT ~~DOES~~ TAKES CARE OF BOTH OF THESE PROBLEMS AND ALLOWS 'PHONE LINE EXCHANGE OF PROGRAMS AS WELL. THE TELEPHONE COUPLER PORTION OF THE CIRCUIT IS STILL BEING DEBUGGED WITH LONG DISTANCE HELP FROM VIRGINIA BEACH.



ALL CAPS. ARE TANTALUM
ALL RESISTORS → 1/4 W.

THE TAPE CONTROL CIRCUIT WORKS FINE EXCEPT IT REACTS TO SOME VOICE SOUNDS AND STOPS TOO OFTEN. IF "P.B." IS REPLACE BY A TOGGLE SW. AND THIS SWITCH IS OPENED AFTER THE CARRIER BEGINS, IT WILL BEHAVE PROPERLY AND THE VOICE WILL NOT INTERFERE.

PLEASE PRINT THE PROGRAM ON THE ENCLOSED TAPE. NOTICE THAT THE BALLY EXECUTES THE ENTIRE GAME USING THE PX(X,Y) METHOD OF DETERMINING OWNERSHIP OF A BOARD SPACE.

ANOTHER TAPE IS GOING TO DICK HAUSER

SINCERELY,

Clyde Perkins

John Hancock
Patriot
U.S.Postage 10¢

Robert Fabris,Arcadian
3626 Morrie Drive
San Jose,Calif.
95127

© USPS 1978

Feb.14,1980,939 College Ave.,Racine,Wis.,53403
Re: SAUCER BATTLE Vol.2,#1,pg.2. Had the usual troubles entering this one. Finally got everything to match the Arcadian printing. Kept getting WHATS or Hows with with LINE 920.It finally soaked in that as printed a BOX operation is being attempted with only 3 entries Changed it to: 920BOX -75 + RND(4)-2, K+RND(4)-2,2,2, 3;NEXT P The game then operated without any WHATS or HOWS. For 1 player operation your saucer sometimes leaves a trail of "stars" in a straight vertical line near the left edge of the TV screen.Have noticed that often horizontal & vertical elements,such as the lines of letters, are sometimes different in color. It seems to depend on what colors are being used.Dont know weth wether to blame the TV or Bally???Would like to know how to get back to a clear screen with black letters withoutRESET and erasing what has been programed.The incorrect 920 left quite a confusing mess.(when a saucer was hit)Got back to a black blank screen with a narrow vertical, color strip at the left when using a colo button.Robert W Dahl

anderson
research
and design
1611 Lacota Lane
Burnsville, MN 55337

February 20, 1980

Robert Fabris
3626 Morrie Drive
San Jose, California 95127

Dear Mr. Fabris:

If all has gone as scheduled with the Postal Service, Richard Houser out in Livermore should be talking to his Bally through the COMPUTER EAR speech recognition system we sent him for review earlier this week.

The system is available by mail directly from Anderson Research and Design, Minnesota, for $59.95 postage-paid. It includes all of the hardware and software listed at the top of page 1 of the 20-page User Manual; I have enclosed a copy of that page, which also describes my firm and the current state of the speech recognition field. The COMPUTER EAR is comparable to the Heuristics SPEECHLAB at $179.95 and the Radio Shack VOXBOX at $169.95.

Please insert an ad for the COMPUTER EAR in the next issue of Arcadian. If you need more information, feel free to call me collect anytime after 4 p.m. your time. You can also get first-hand information directly from Houser, who has the actual system. He will be reviewing the system for publication in Arcadian. This is the first offering of The COMPUTER EAR; we have done no other advertising. We are now working on a configuration for the Commodore PET, which will be slightly more expensive, and at the time of release of that system (Summer 1980, we hope) we may commence ads in the hobby magazines. The Bally configuration is available now, however, with delivery in 2-4 weeks from order.

I wish to thank you again for the thousands of hours of work you have expended in building and maintaining Arcadian. Please realize it is not a thankless job. On the subject of the newsletter: A.R.D. also invites readers to send for our free catalog of esoteric software, ranging from chess, cryptography and sports car rallying to operational programs like the enclosed sample: consider it our entry in your unofficial "Spell ARCADIAN" contest. We've seen the entries to date, all involving BIG LETTERS. Your original request, however, was for lower-case, so here are two from our varied type fonts: ARCADIAN in lower-case sans serif and serif type styles. We can also do everything from Old English to Franklin Gothic, just by POKEing the correct values into screen memory. You may publish the program if you wish, although it is not self-explanatory. It is based on the digital values of the screen memory bytes, and our chart would require a full page in

Arcadian. One also needs the screen map and a tutorial on how to use them. If you wish to expend the space, I will be glad to write an article and Xerox the charts. Otherwise, interested subscribers can simply write me at A.R.D. and enclose $3.00 for Xerox and mailing costs, and we will send them the whole package. (One is not limited to type faces. He could do Snoopy Calendars or Elvis Presley's face if he wanted to...but who would want to?)

Thank you again for your efforts over these last two years. Please change my subscription to your "special interest" mailing list; I am eager to stay up on any news regarding expansion, especially your PROJECT ONE S-100 buss board. Besides, Dick Houser tells me I am missing a lot because I've got the wrong-colored dot (orange?) on my mailing label...

Best wishes;

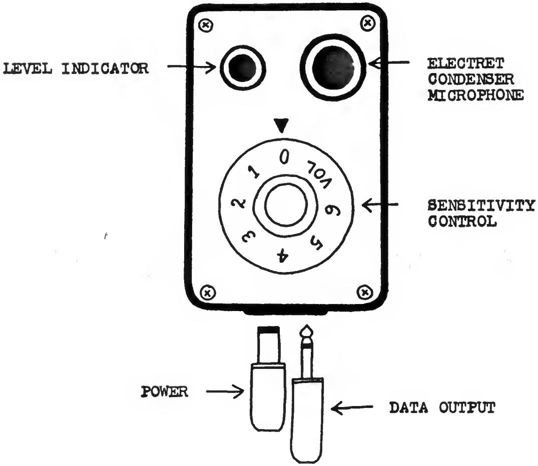
Sincerely,

C Anderson

Craig J. Anderson
ANDERSON RESEARCH AND DESIGN
Burnsville, Minnesota

The COMPUTER EAR

User manual



anderson research and design

1611 Lecota Lane
Burnsville, MN 55337

Your COMPUTER EAR system includes the following:

- Audio amplifier with optically isolated analog data output.
- Power cord with DC plug and battery clip.
- Computer input cable with RS-232 9-pin female connector.
- User manual.
- Program cassette: Side 1: Digital Oscilloscope
  Flash Math
  Side 2: Speech 1.8
  Speech 4.2

The Digital Oscilloscope displays speech waveforms graphically on the screen. Flash Math is an example of a simple two-word speech recognition program using average amplitudes. Speech 1.8 is the basic speech recognition program with 1800 bytes of available RAM. Speech 4.2 is an advanced speech recognition program which "borrows" an additional 2400 bytes from the screen memory for an overall memory size of 4200 bytes!

INTRODUCTION

Anderson Research and Design was formed in 1972 by C. J. Anderson, a Minneapolis-based communications security consultant, to design and build custom communications security systems. We've been working with audio systems a long time, and when we became hooked on microcomputers in 1978 it was with the intent that eventually we would want to talk to them. The COMPUTER EAR is the result of our efforts to date.

Speech recognition by machine is not a well-developed field. It has not totally disentangled itself from the science-fiction world of Artificial Intelligence. After all, computers cannot "think," so how can they "talk" or "hear?" Do they merely mimic these human attributes, or is the rapid switching of electric current that allows them this pretense the same thing that is taking place in the human brain? Evidence suggests it may be.

There are no "turn-key" speech recognition systems on the market. The COMPUTER EAR is not an exact peripheral, like a printer, the results of which are exact and well-defined. It is highly experimental. We have achieved accuracy of upwards of 80% with the COMPUTER EAR, but only after patient practice and a solid understanding of the concept. We cannot possibly convey all that we have learned in this manual; we can only give you the basics and leave the rest to your own talent and imagination. We will be more than happy to answer any questions, give you further details, help you with any applications or correct any problems immediately. In addition, we will be sending out periodic updates as our system, and the field of speech recognition, becomes more sophisticated. To get on our mailing list, just send your name, address, date of purchase and make of your computer to:

Anderson Research and Design
1611 Lacota Lane
Burnsville, Minnesota 55337
Phone: (612) 894-2633

"Naked RAM" - Godbout
50 pin plug
buffer data lines, not address lines
not able to write
6" cable

~~98503 Mike Reeves 10530 Mullen Rd SE Olympia~~
99216 Todd Johnson E12804 23 St Spokane
99216 Ken Knudson E13321 - 12 St "

DONALD E. LONG
812 1ST AVE. SE.
EPHRATA, WASH.
98823

February 28, 1980

Called 3/5

509 ~~206~~ - 754-2948

Arcadian
Robert Fabris
3626 Morrie Dr.
San Jose, CA 95127

Dear Bob,

Thanks very much for the prompt attention given to my recent subscription. The info clears up a lot of questions about things I had discovered but didn't completely understand.

My unit is a model BL-1200 (purchased from JS & A), serial no. 1507.

I don't recall reading anywhere that the screen RAM can be written on as if it started from Address 0. Try %(0)=-1. You should get an 8 pixel line in upper left hand corner.

I am interested in receiving information on your memory addition board, mentioned in several places in Arcadian.

I am also interested in the document listing routine descriptions and object codes mentioned in Vol 1 pg 83.

Please send me the following:

Executive SoftWare (Vol 1 pg 16)	$1.00
Hackers Manual (Vol 1 pg 31)	2.00
Check enclosed	$3.00

EXACTLY HOW

I have added a 4K memory to my unit. My future plans include more memory, a keyboard, and a Heathkit H-17 floppy disk.

I have written a disassembler program which converts machine language code to assembly code. I suspect this may not be very useful with the documentation you have available, but let me know if you would like a copy of the program. Here's a sample of what it does:

yes

```
0000    NOP
0001    DI
0002    XOR  A
0003    OUT  (8),A
0005    JP   $0C66
    :
    :
0C66    LD   A,($2000)
0C69    CP   =195
0C6B    JP   Z,$2000
0C6E    LD   SP,$4FCE      ← {this is where
0C71    RST  7                {to go to
    :                         {bring up menu.
    :
```

Do you have a list of subscribers by → area so we could find out who in our area to share experiences with?

Very truly yours,

Donald E Long

BILL RUEGER
336 BEACH 38TH ST
FAR ROCKAWAY, NY 11691

Dear Bob,

Here are a few suggestions for projects to work on for the Bally. How about some way to hook up a modem to the Bally so that it can tie into a time-sharing network such as "Micronet" or "The Source". This would really expand the capabilities of our small system. Electronic Systems - the same place where you got the printer interface - sells a kit, #109A for $27.50. If this could be hooked up, it would be very inexpensive.

Also, a diagnostic cartridge would be a big help, especially as the Bally system and peripheral devices grow.

Data processing is also a must, perhaps with some way to increase the number of lines per "page" on the Bally display.

Bob, I wonder if you could do me a favor and answer a question? I'm enclosing a SASE for your reply. I have a printer that accepts input at 110 Baud. The Bally outputs at 300 Baud. Is there any way to change the output Baud rate of the Bally?

Finally, keep up the great work. I wait avidly for the Arcadian each month! Your work on the memory expansion board sounds great and I hope that it turns out OK as it is a much needed piece of equipment if the Bally is ever to become more than a "video-game".

Thanks,

Bill

2-4

10

Dear Sir:

Please note that if you add the following two lines to random box on page 17 it makes it a better program.

```
MODIFIED A version                    B version
75 BOX -1, -1, X, Y, 3          or    75 BOX 1, 1, X, Y, 3
80 BOX 1, 1, X, Y, 3
85 GOTO 30
```

I would like to see a self-diagnostic cartridge. I am wondering what
happened to the one promised by Bally, The S-100 interface card is a good
idea, I think an extended basic-in-eprom would be good. The Bally
Basic would be left in the cartridge slot but would plug in to the S100 slot
and add string functions and data statements. I am also interested in your
add-on memory. It would be best like you described it with 4K
and sockets to increase it up to 16K. Better control of the 256 colors
would be very good because with only 2 under full control and 4 under partial
control there are too many things that can't be done. It should be possible
to put 8 different colors of boxes on the screen at the same time. Does anyone
know how many Bally Arcades, Basic cartridges, & tape interface that have been
sold? Does anyone know if Bally will produce the light-pen or any software
tapes?

Sincerely yours,
Erwin G. Ender
Box 6644
Lemay, Missouri 63125

Sam #4.
B #4 Jul

2/5
Query

G J Motsko
14898 Easingwold
Houston, texas 77015

Mr. Robert fabris
3626 Morrie Dr.
San Jose, Calif 95127

Compliments on your Newsletter. There's a lot more information in it than I expected & well worth the $10 subscription price.

I have a few interesting programs in mind & I'd like to make a contribution by sending same in, however, I need some tutorial help in one area.

I'm interested in learning something about the principles employed in creating the illusion of movement by having for example; a starfield move across the screen causing ~~the~~ a stationary spaceship to appear to be moving or a skier moving from left to right across the middle of the screen as a controlled object while the ski run moves from bottom to top creating the illusion of downhill movement.

race track

My first impression on seeing some of these games is that ~~part~~ all of the background is scrolled in some direction, however, now I'm not so sure. The starfield, for example, would be part of the total foreground & how do you scroll part of the foreground & control another part!!?

Anyway, if any of the subscribing experts can shed some light on this frequently employed concept, I would appreciate it.

I have a feeling that we will be seeing some corrections to Saucer Battle in volume 2 No 1. I've input this program & it appears to hang up on line 920. My first impression was that John Hurst omitted the box color, but programming in a 3 as in line 820 doesn't appear to solve the problem I am experiencing.

When the computer scores its first hit, line 920 appears on the screen in a jagged manner, almost unreadable & from then on, nothing works right.

Keep up the good work.

Sincerely
Jerry Motsko

Mark R. Angliss
3365 Chisholm #104
Boulder, Colo 80301
303-449-5284

Dear Bob,

I received all the material I requested from you, & did some construction of light pens, etc. First of all, I strongly recommend that you not publish the black & white monitor to Bally schematic, it works alright, however the T.V. chassis & computor become commonly grounded. Many (most in fact) T.V. chassis have one side of the 110 volt plug tied to the chassis, Bally, plug in transformer, or personal injury could result. I suggest that designs to be affiliated with television chassis by direct connection be isolated. Opto-isolators may be feasible, however I have not pursued this any further. ⌶ Light pens, I built both you sent me, neither work reliably. Both are highly influenced by screen brightness, ambient room light, T.V.I. (hair dryers, light switches, auto ignition) any noise, just the slightest induced into the T.V. picture. Also calibration is difficult. I am working on this circuit as time allows enclosed is what I have to date, though admittedly it's far from perfect. When I control it's "temper" I'll let you know. I'm also working on a keyboard & RAM. expansion as time & finances allow.

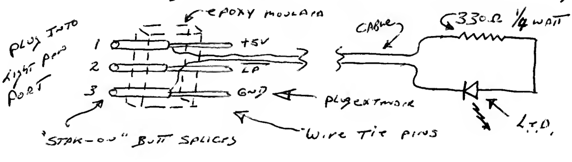
→ Brief notes to whet experimenters appetites:

1) On the expand connect; video in, vertical drive, horizontal drive, audio in. → Bally to T.V. camera connection ????

2) Fidelity Electronics, chess challenger 7; Z-80 based computor possible connection of it's R.O.M. to Bally? (Software reqd.)

3) Thermistor to handle input ports, computor thermometer?, (store & graph temperature fluctuations)

→ Non-disassemble-your-Bally-power-on-light ←

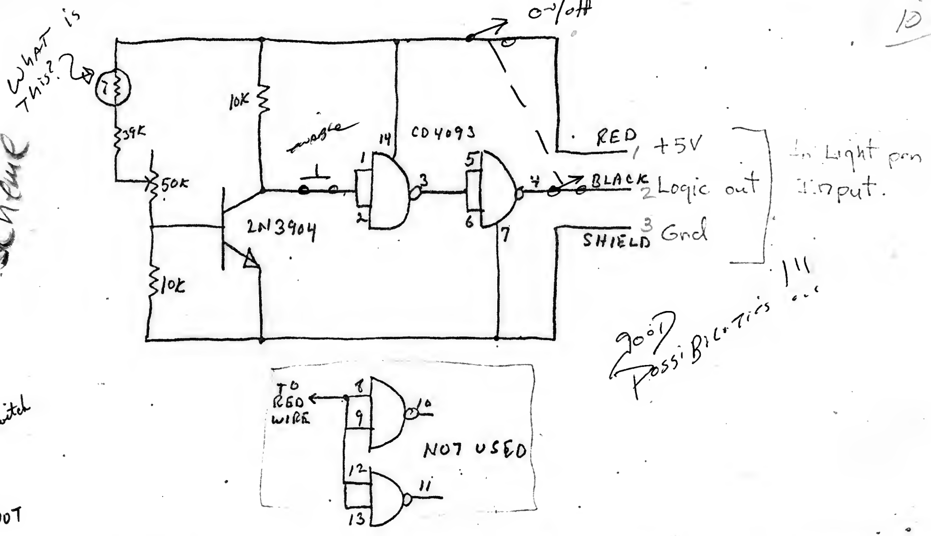


Connect between light pen port & cassette interface adaptor plug

Locate L.E.D. for convenience

Mark

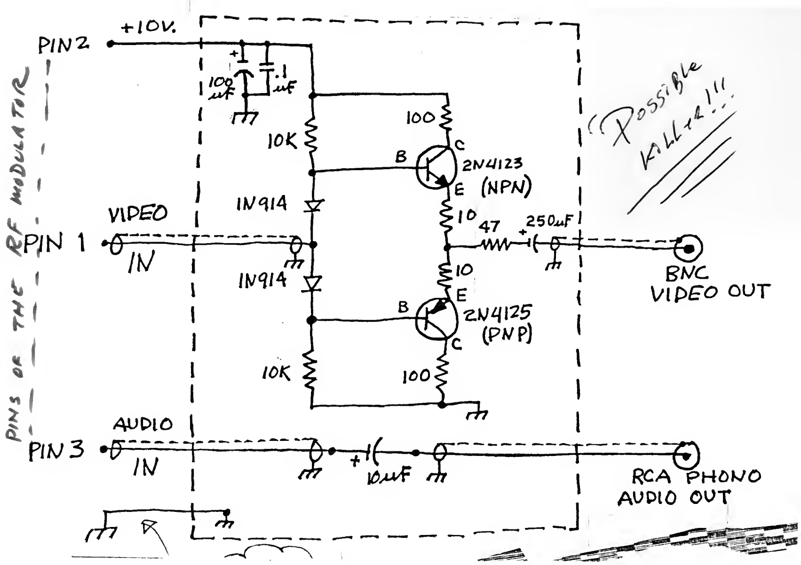
One scheme

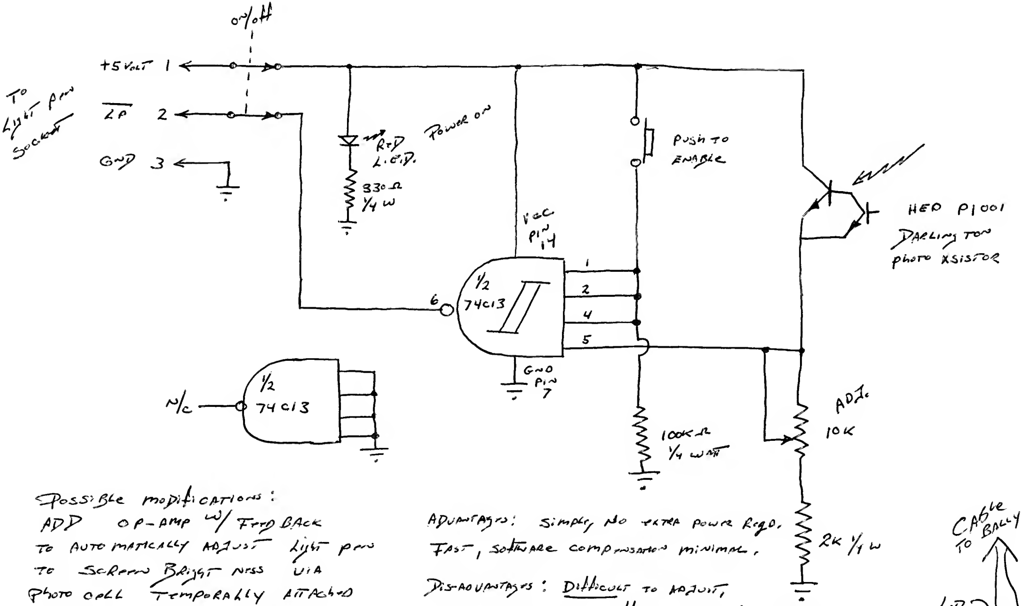


needs a switch

:INPOT

FOR Light Pen to work use &(14)=X &(15)=Y - As per hackers.
Make a Loop which will produce a flashing box in center screen
0,0 Make &(14)=0 &(15)=0 Run & Use pen to turn box on & off
Can also be used to start next page of reading Mat. on Screen.
in Hire flashin Cursor at end of that page or List.

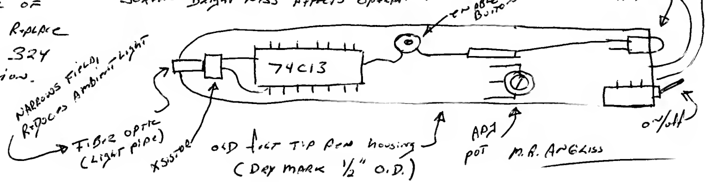

PINS OF THE RF MODULATOR
PIN2
+10V.
100 uF
.1 uF
10K
100
B
C
2N4123
E
(NPN)
1N914
VIDEO
PIN 1
IN
10
47
250uF
BNC
VIDEO OUT
1N914
10
E
B
2N4125
(PNP)
C
10K
100
AUDIO
PIN 3
IN
10uF
RCA PHONO
AUDIO OUT
"Possible Killer!!!



Possible modifications:
ADD OP-AMP w/ FeedBack to Automatically Adjust light pen to Screen Brightness via Photo cell Temporarily Attached to lower left hand corner of Picture Tube face to Replace 10 K ADJ. POT. Suggest 324 For single voltage operation.

Advantages: simple, no extra power Reqd. Fast, software compensation minimal.

Dis-advantages: Difficult to Adjust, Screen Brightness Affects operation.


Cable to Bally
LED
Enable Button
74C13
Narrows Field, Reduces Ambient Light
Fiber optic (Light pipe)
Xsistor
Old felt tip pen housing (Dry mark 1/2" O.D.)
ADJ pot
on/off

M.R. Angliss

2-47

Dear Bob,

Sorry for getting this to you so late.

I don't know if your interested but I have a disassembler program written that prints hex location followed by the 1, 2, 3 or 4 byte hexadecimal characters. Example:

```
Hex Location
  0010     C3  0A  20
  0013     06  FB
```

I'm still working on adding mnemonics to the print out.

A friend of mine made a matrix printer using the CY480 printer chip, which I do my prints out on useing the digital out from the audio cassette interface.

If you have any members in the Grand Rapids area (zip 49XXX), let me know so I can get in touch with them.

It looks like I missed Pages 39-46 of last years series. If you still have any, can you send it.

Thank-You!
Pete Sneathen

P.S. Keep up the Good Job!

MILWAUKEE, WI 53
PM
17 JAN
1980

John Hancock Patriot
U.S.Postage 10¢

Robert Fabris
3626 Morrie Drive
San Jose,Calif.
95127

ARCADIAN
© USPS 1975

Jan.17, 939 College Ave.,Racine,Wis.,53403 2/4

Dear Mr. Fabris,

It might be a good idea to advise your readers to check from time to time wether or not the Arcade's automatic turn-off feature is working.Got the idea to test it on my 1¼ year old unit and it ran for over 20 minutes without blanking out the TV screen.Tried it with the Brickyard/Clowns cartridge in the thing and with one of the built-in games, & no cartridge. Have also noted the C key does not stop action games such as Brickyard &Pinball.It works normally for the calculator, SCRIBLING, and with the Basic/Interface combo.Some of the keys are a bit touchy when used with the Basic.They sometimes register when you push the button and again when it is released. Will be mentioning your publication to another Arcade dealer here who hasnt heard of it yet.Sincerely, Robert W Dahl

Robert W Dahl

January 25, 1980

Dear Robert Fabris,

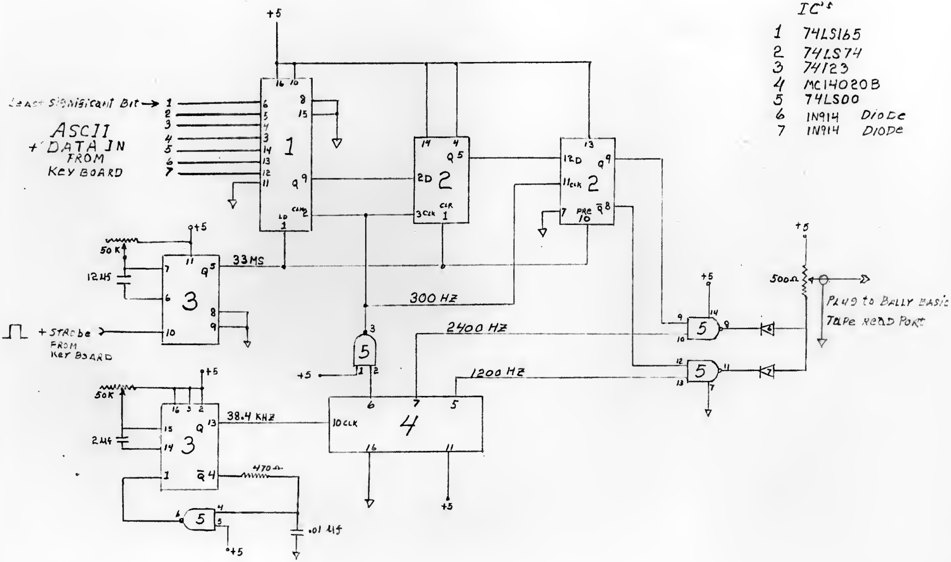
I have recently designed and built this ASCII keyboard interface. I felt that fellow Arcadian subscribers would be interested. It is very low in cost and only has two adjustments that require an oscilloscope. A hardware friend or local T.V repair man can make the adjustments in just a few moments. Plug the keyboard interface into the Bally audio interface and enter: INPUT GO into the Bally key pad and the ASCII keyboard comes alive. All control commands are ASCII lower case and alpha-numerical characters are upper case, as indicated in the Bally Basic Hackers guide. Happy programming!

Sincerely,
George Bozdog

P.S

I haven't as yet received the Arcadian pages 69 thru 76 of volume one. They must have been lost in the mail. I would very much appreciate the complete volume one.

ASCII Keyboard Interface To BALLY BASIC AUDIO Cassette Interface



IC's

1	74LS165
2	74LS74
3	74123
4	MC14020B
5	74LS00
6	IN914 DIODE
7	IN914 DIODE

March 3, 1980
Box 61
Claude, TX 79019

2/5
Actd

pa 4 3/9

Dear Robert,

Enclosed is a check for 3$ for the PA-1 Service Manual, and the Hackers manual. Also enclosed is the program I mentioned on the phone. I call it count the dots. Since my wife and I are not experienced programmers, there are probably a lot of unnecessary parts to the critter that use up memory, but since the whole thing is within the 1800 available, only a severe editor would take the time to ferret the waste out. Actually, it isn't that bad, the stats take up the room.

The tape I am sending is recorded on both sides with the same game. Just before writing this cover letter, I decided to put in a portion that would compute reaction time/correct round in seconds (approx) using 45 as my figure, which is close enough for this program. This changed program is on side two and it will load faster than side one, even though it contains more bytes.

You have probably noticed in your operations of the Bally that occasionally you will get a program that loads faster. Now I found quite by accident that if the machine is in the NT=0 mode to begin with, it will still print the list on tape. This is aside from the :PRINT;NT=0; LIST and is the same as Ed Larkin's NT=0:PRINT; LIST . Of course I get audio. But Ithink the NT is 1 even when the machine is in NT zero mode, at least as far as taping. Anyway, this program is mostly in NT=0 and when taped after running is in the zero mode and loads and unloads faster than side one.

60

I mentioned that I grounded my unit. I am not yet sure that this is the entire answer nor am I sure that it is not. I am on my second unit, and the first unit worked fine except that static blew chips that are associated with the 2 and 4 hand controls. In both cases, it was I who picked up the charge and felt the spark discharge to the knob of the hand control, and that did the damage. After getting my second unit, I decided to attempt to eliminate the static if possible at least in the keyboard area and the internals except for the hand controls.

I removed the cover; facing the unit with the keypad in the operating position I observe 2 metal screws with locktite adhesive compound on them to the left of and below the keypad buss which is a foil wrapped ribbon. The left one of the two metal screws is removed and a good conductor mostly insulated is attached to a connector and inserted under the screw; the screw is retightened. The other end is grounded. I used one side of an old extention cord, knotted it at a point where it would pull on the case instead of the internals and ran it out the back of the Bally beneath the incoming power supply cable. Since then I have not had a single static discharge to the keppad while operating the unit. The other end of the cord is just grounded. (In My case, I just ran the thing into the rug, getting a grip on the rug with an alligator clip, since I didn't run enough to reach a good ground.) Now, though I don't like the idea, it seems that if the Hand controls were also grounded, say by a piece of aluminum tape affixed to the handle so that one would have to tough it when getting a hold on the control, then running a wire along the cord and either into the ground wire from the guts of the bally or to some other ground, a good part of the static caused chip failure could be totally eliminated. I do not know why Bally did not attempt this in the first place, and would bet that most of the problems they have had insofar as working units that are returned after a time of proper functioning are a result of this lack of design feature, that is, everything must be safeguarded from possible static failure. It seems to me to be a very cheap addition. I speculate that the hand controls could be opened up and a good place for a ground wire could be found that would eliminate the static problem. Better, would be a ground to protect the internals at some point near the plug-in on the back and before the static can follow the other"little electrics" into the chips in the Bally's guts. I look forward to getting the manual and a decent schematic. Has any one else done this?

p87.

Is that an RS-232 edge connector on the back? I would like to be able to just buy a few Static RAM chips and expand the memory that way. At present I do not know enough about circuits, digital computers, or anything else to be able to do this; I have embarked on a course of self-study, and I am learning.(I have actively resisted and fought any excursion into electronics for many many years) But now, I'm fascinated and woefully out of practice. But I am the kind of person that hates to have anybody else do something that I can probably do from tuning up the car to my own welding and woodworking and tuning up the motorcycles or whatever--time is the reason I do not always practice this. Since this is a hobby (suddenly) I guess I'll just have to learn to do it. Besides, I'm supposed to be more intelligent than about 99% of the population--it then becomes a matter of applying ones self to a task. And basically I guess I'm lazy unless interested. Now, darn it, I'm interested and out of the practice of studying. (usually I either immediately grasp something or I just don't want to hassle with it.) This " electronics and computers"forces me to excersize my brain and I find active internal resistance to such effort.

I put the copyright on there simply because I can, but as this will probably never be used for any profit...I am giving you the right in writing to use this as you see fit. I hope that it is stimulating but not too taxing or frustrating, or that it is not too trivial.

Sincerely,
Les Porter
Les Porter, Jr.
Box 61
Claude, TX 79019

~~B~~ P.S. enclosed is
also one of my cards.
Also - Could you send me a copy from your Printer?

March 5, 1980 2/5

Dear Robert,

Just got the latest copy of ARCADIAN , and I guess I'l have to see if I can find the error or correction in Biorhythms. Maybe I already did?

As a not too experienced programmer, I have utilized a number of means to solve problems in my own programs and in the published ones I get thru Arcadian. This rather obvious approach might be use ful to readers.

Lets say that the computer spits out a HOW? Then it lists line 460 or whatever and sticks a question mark in there somewhere. The question the user has to ask is WHY did it do that?

1. Often it is a math error. That is, it doesn't know the answer to such things as dividing by zero. Neither do we, and we can say it is infinite--which is something the computer doesn't understand. Anything divided by zero is undefined. It wants to know how...

   The other math error is one which produces a number that is larger than a+ or - 32767. Which is the biggest thing that the computer can normally handle.

   DONT EVER FORGET THAT THE COMPUTER JUST HANDLES NUMBERS.

2. On the subroutines(GOSUB) and on the go someplace else(GOTO) the computer spits out a HOW if it can't go there. On the computed GOSUB's and GOTO's, it is simple to find out if there is something there. Usually there is nothing there, so it can't go there.

3. Essentially, then--there are the following possibilities.

   1. You have a forbidden mathematical operation.
      - A. You are trying to divide by zero. thats a no-no.
      - B. You have obtained a number too big for Bally to compute (in Absolute value), greater than ±32767 and that is a no-no. (yes, dividing by zero makes too big a number, also--like, its infinite, and that is big...) Really 0 divided by 0 is undefined. You cant get something for nothing.
   2. You have tried to send the computer to a place it can't go.

Lets suppose that you have run along just fine and the computer asks How?. THEN IT LISTS A PARTICULAR LINE AND INSERTS A QUESTION MARK.

There will be some Variablesin that line. Study it. See if indeed you are multiplying or dividing. Or going somewhere. Suppose it is an (((Mx10)+20÷E)+X)?or anything else. By golly, you have a computer, use it. Tell the computer Print M, E, X (In somecases List 460, 1)

And it will.

Say M is 0 , E is 0 and X is 10. Well you can inspect the above and say the crash occured when you tried to divide 20 by zero.

all right? All computer crashes will occur in that type of situation. You cant use too big a number, you cant divide by zero, and if it is supposed to go somewhere... well see if there is any thing there to go to. I use the Print (Mx10), E, 20/E, X etc to get some idea of what numbers the program and the computer are dealing with. Also, If I missed some thing, I List, 1 etc. Remember, you can also put in GOTO 430 or whatever anytime you need to. After a game, and if I missed some stats or I want to check something out, I just pop in a GOTO.

The key is to remember that the computer uses numbers and that there are some numbers that are too big or not allowed.

The making of sense out of a mistake is a bit harder. But again, just reason the thing out and have some idea of what you think is supposed to happen. The computer is a tool. Since we can use the tool, use it. When your tool doesn't work, use your head. You'll be surprised how that works out.

Sincerely,
Les
Les Porter, Jr.

P.S. Edit the Above if you think it would be useful -
you can probably condense it.

Box 69
EXSHAW, ALBERTA,
CANADA TOL 2C0
MARCH 11/80

2/5

Robt. Fabris
3626 Morrie Dr
San José CA 95127

DEAR SIR:

THE BALLY ARCADE DOES SEEM TO HAVE A SELF-DESTRUCT LINE AND A WARNING SHOULD BE SENT TO OWNERS TO AVOID IT! HERE'S WHAT HAPPENED:—

I NOTICED THAT &(9)=-1 MAKES A BETTER BOTTOM BORDER. I POKED AROUND MORE AND ENTERED &(9)=-42. INSTANT UNCONTROLABLE GARBAGE! I TRIED RE-SETS, UNPLUGS, START-UPS, ECT. THEN SHUT IT OFF FOR SEVERAL HOURS. WHEN I TRIED AGAIN IT SEEMED TO WORK OK SO I PUT IN &(9)=30 IT TOOK IT AND A RE-SET RETURNED THINGS TO NORMAL.

BUT, THE NEXT DAY I STARTED IT AGAIN AND HAVE UNCONTROLABLE GARBAGE AGAIN-

THAT SELF-DESTRUCT LINE WAS &(9)=-42.
WARN PEOPLE-

Yours truly,
G W Miller

HOME VIDEO GAME SYSTEM

This documentation describes the Bally Home Video Game System. The description begins with a discussion of the major sub-sections of the system. Following this, each sub-section is presented in greater detail, with detailed particulars, such as calling sequences and resource use.

The major sub-sections of the system are:

The User Program Interface...which allows cassettes to reference the system routines through a standard interface. Includes an interpreter.

The Screen Handler...a complex of routines for creating screen images. Includes facilities for initialization, pattern, and character display, co-ordinate conversion, and object vectoring.

The Interrupt Processor...decrements timers, plays music, and produces sounds.

The Human Interface...reads keypad and control handles, inputs game selection and options.

Math Routines...a package of routines for manipulating floating BCD numbers.

DO NOT REPRODUCE
Dave Nutting Associates, Inc
PROPRIETARY INFORMATION

This is a typical page of the Manual. An infinitesimal portion of the object code section is absolutely illegible. Most every thing else can be read. $15 00

7

79-6-2

```
  1   .*SAUCER BATTLE*
  2   .
  3   . BY JOHN HURST
  5   .     9/79
 10   F=0;G=0;I=0;J=0;NT=1
 20   CLEAR;BC=0;FC=126;&(0)=0;&(1)=0;&(2)=126;&(3)=0
 30   INPUT"DIFFICULTY:0→1 ?"N
 40   PRINT "HOW MANY
 50   INPUT "LASER BLASTS ?"U
 60   INPUT "MAX SCORE ?"H
 70   INPUT "1OR2 PLAYERS ?"L;IF L=1 INPUT "ACCURACY OF COMPUTER:0→2 ?"M
 80   CLEAR;FOR A=1TO50;B=RND(130)-65;C=RND(88)-44
 90   BOX B,C,1,1,1;NEXT A;CX=-17;CY=40;PRINT "←SCORE→
100   CX=-77;CY=32;PRINT  #10,J,#8,I;IF L=1 GOTO 300

200   K=KN(1)÷4-6;D=KN(2)÷4-6
210   BOX -75,K,4,4,3;BOX 75,D,4,4,3
220   IF F>=U-5 BOX -75,K,2,2,3
230   IF G>=U-5 BOX 75,D,2,2,3
240   IF F>=U-5 BOX -75,K,2,2,3
250   IF G>=U-5 BOX 75,D,2,2,3
260   BOX -75,K,4,4,3;BOX 75,D,4,4,3
270   IF F=U IF G=U GOTO 1000
280   IF(TR(1))-(TR(2)) GOTO 500
290   GOTO 200

300   D=RND(76)-38
310   K=KN(1)÷4-6;D=D+RND(10)-5
320   IF D>25 D=25
330   IF D<-38 D=-38
340   BOX -75,K,4,4,3;BOX 75,D,4,4,3
350   IF F>=U-5 BOX -75,K,2,2,3
360   IF G>=U-5 BOX 75,D,2,2,3
370   IF F>=U-5 BOX -75,K,2,2,3
380   IF G>=U-5 BOX 75,D,2,2,3
390   BOX -75,K,4,4,3;BOX 75,D,4,4,3
400   IF F=U IF G=U GOTO 1000
410   IF F=U GOTO 440
420   IF TR(1) GOTO 600
430   IF G=U GOTO 310
440   IF M=1 GOTO 480
450   IF M=2 GOTO 490
460   IF K>D-1 IF K<D+1 GOTO 700
470   GOTO 310
480   IF K>D-3 IF K<D+3 GOTO 700
485   GOTO 310
490   IF K>D-6 IF K<D+6 GOTO 700
495   GOTO 310
```

79-6-3

```
500   IF F=U GOTO 530
510   IF TR(1) GOTO 600
520   IF G=U GOTO 200
530   IF TR(2) GOTO 700
540   GOTO 200

600   BOX -75,K,4,4,1;BOX 75,D,4,4,1
610   F=F+1;LINE -73,K,4;LINE 75,K,3
620   &(16)=255;&(21)=255;&(23)=44
630   LINE -73;K,4;LINE 75,K,3;LINE 0,0,4; &(16)=0;&(21)=0;&(23)=0;IF N=1 GOTO 670
640   IF K>D-2 IF K<D+2 GOSUB 800
650   BOX -75,K,4,4,2;BOX 75,D,4,4,2;IF L=1 GOTO 300
660   GOTO 200
670   IF K>D-3 IF K<D+3 GOSUB 800
680   GOTO 650
700   BOX 75,D,4,4,1;BOX -75,K,4,4,1
710   G=G+1;LINE 73,D,4;LINE -75,D,3
720   &(23)=255;&(21)=255
730   LINE 73,D,4;LINE -75,D,3;LINE 0,0,4;&(21)=0;&(23)=0;IF L=2 IF N=1 GOTO 770
740   IF D>K-2 IF D<K+2 GOSUB 900
750   BOX 75,D,4,4,2;BOX -75,K,4,4,2;IF L=1 GOTO 300
760   GOTO 200
770   IF D>K-3 IF D<K+3 GOSUB 900
780   GOTO 750
800   FOR E=1 TO 10;&(9)=37;&(2)=90
810   FOR P=0 TO 1
820   BOX 75+RND(4)-2,D+RND(4)-2,2,2,3;NEXT P
830   MU=""";NEXT E;&(2)=126;&(9)=50
840   J=J+1;CX=-77;CY=32;PRINT #10,J
850   IF J=H GOTO 1000
860   BOX 75,D,10,10,2;RETURN

900   FOR E=1 TO 10;&(9)=4;FC=90
910   FOR P=0 TO 1
920   BOX -75+RND(4)-2,K+RND(4)-2,2,2,3;NEXT P
930   MU=""";NEXT E;FC=126;&(9)=50
940   I=I+1;CX=-17;CY=32;PRINT I
950   IF I=H GOTO 1000
960   BOX -75,K,10,10,2;RETURN

1000  CX=-23;CY=0;PRINT "GAME OVER
1010  R=KP;IF R=13 GOTO 10
```

Bob,

These papers are to use with your joystick controller. Any information on these 2 pages can be reprinted except the listings (both Basic & hex). As you can see, a lot of it has to do with machine language and pokeing,

Jim Hays

H.C.Version

INSTRUCTIONS TO
STAR FIRE

CODE: Basic/Machine language

The object of this game is to shoot down all the moving characters that appear on the screen. They appear one at a time going steadily in a chosen direction, you move your controller so that you can follow the target as if you were sitting in a ship. You move the controller to the right and your ship moves to the right while the target moves to the left. You push the stick foreward and your ship goes into a dive downward as your target moves upward etc. To get familar with these operations, just move the controller in any direction and watch the background moving stars. It may take you a while to get used to the movement, but those who know the operation of flight shouldn't have any difficulty. The amount of time remaining is in the top-right corner, it starts at 200 and decrements. This is the variable 'U' which can be changed in line #1. At the bottom-left are messages, bottom-center is the number of points that shot was worth, bottom-right is the total accumulated points. Points start at zero and advance in increments of 46 minus the number of loops it took you to hit the target. So the faster you react, the more points you get along with saving time. Foreground color changes along with point values in increments of 32, maximum FC value is 166-light green. If the enemy hits you, you lose 10 points for this hit and 32 points for energy lost the next time you hit something. So getting hit just once will really hurt you in points and energy. Points will now go positive again. There is a one out of nine chance that the enemy will fire at you in any given loop. If he fires at you, you will see a rectangular box getting larger and moving down-screen. You can fire at the same time the enemy is fireing on you, if you think you can hit him in 4 loops. The enemy takes 6 loops before he hits you. (A loop is each time a character erases and replaces itself) To evade the enemy's shot, simply make sure the top of his ship is below the center of the screen, when his shot dissappears, push foreward on the stick and dive down to fire on him.

One of three characters will show up on the screen, a fighter, a refueling station, and a meteor/planet. The fighter and refueling station can both fire on you and the background color will be a deep blue, the meteor will not fire and the background color will be black. There will always be two X and Y boxes that line up your target alongside the grid so that you don't even have to watch your target in order to hit it in the center.(Points 1 & 2 on the Specs. page) After the program loops 12 times the target appears 2 times the size in the effect that you are getting closer to the object therefore he gets larger. If the object goes off-screen, you have to go after him in the same direction he went off.

The machine language program takes 31.9 seconds to load, directly after the Basic program loads. It uses only 60 bytes, but not of basic memory, this program is stored in the Line Input Buffer but after the first 20 bytes of the buffer so you can still use the keypad (up to 20 bytes) without erasing the machine language program. Listing of this program is given (in HEX).

As you can see, this program can do many things at once and the subroutines should have great educational value in themselves. The more you look, the more you will find in this program.Remember, it took 4 months to develop. Happy hunting!

NOTE: The Assembler (the program that wrote the machine lang. prog.) is avaliable for $2.50

ARRAY HANDLING IN THE INTERFACE PROGRAM

The Test 1 program was fine for generating a single line projection, but images are formed from many lines or an array of lines. This is where the input array concept comes in. A list of lines can be placed in a BASIC array and a loop can be set up to feed the lines to the 3D to 2D converter, one at a time. The Q, R, and S values correspond to X, Y, and Z start and end points. The following list, which should be entered at locations 1000 to 1035 represents a pyramid.

@
↓

1000	Q(1)=100	pt 1	line 1
1001	R(1)=0		
1002	S(1)=1100		
1003	Q(2)=500	pt 2	
1004	R(2)=0		
1005	S(2)=1100		
1006	Q(3)=500	pt 3	2
1007	R(3)=0		
1008	S(3)=1100		
1009	Q(4)=300	pt 4	
1010	R(4)=0		
1011	S(4)=1400		
1012	Q(5)=300	pt 5	3
1013	R(5)=0		
1014	S(5)=1400		
1015	Q(6)=100	pt 6	
1016	R(6)=0		
1017	S(6)=1100		
1018	Q(7)=100	pt 7	line 4
1019	R(7)=0		
1020	S(7)=1100		
1021	Q(8)=300	8	
1022	R(8)=400		
1023	S(8)=1200		
1024	Q(9)=300	9	5
1025	R(9)=0		
1026	S(9)=1400		
1027	Q(10)=300	10	
1028	R(10)=400		
1029	S(10)=1200		
1030	Q(11)=300	11	6
1031	R(11)=400		
1032	S(11)=1200		
1033	Q(12)=500	12	
1034	R(12)=0		
1035	S(12)=1100		

Figure 20. An input array for a pyramid

PYRAMID SHOWN NEXT PAGE
Q=0 ; R=100 ; S=200

Test 2, an array handling modification of Test 1, can now be entered and run. Remember to enter the pyramid values also. The program will ask for viewer's information as it did before but line start and end points will be read sequentially out of the input array. All six screen lines will be printed on the terminal.

Many-lined images can be drawn using larger Q,R,S array sizes but BASIC uses up memory fast. Large amounts of memory will be needed to generate large, complex scenes. This is one of BASIC's disadvantages.

PROPRIETARY
INFORMATION

PARTIAL
NOTES
OF
TIM
HAYS

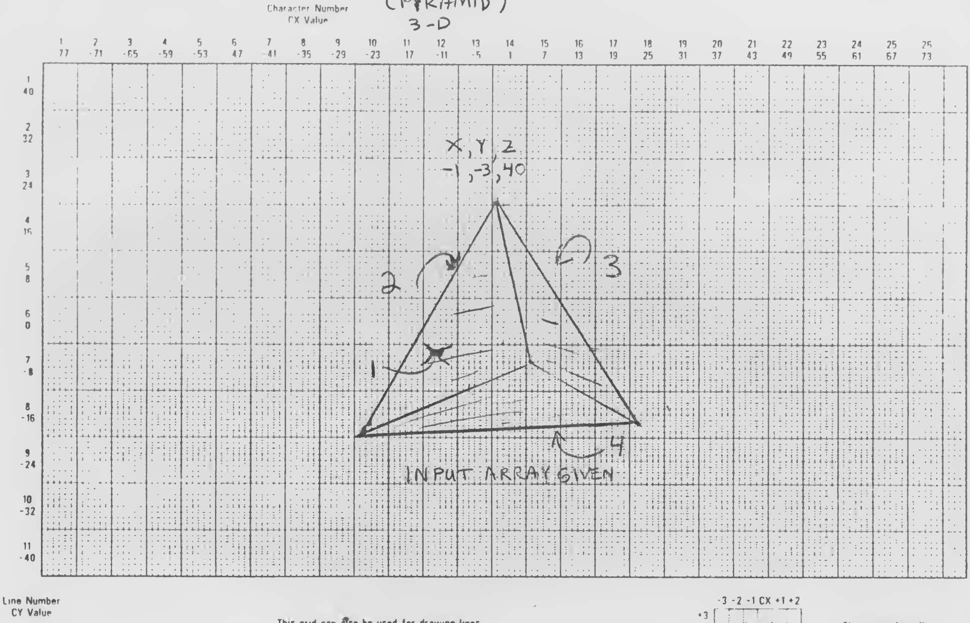
Sebree's Computing
456 GRANITE AVE.
MONROVIA, CA 91016
(213) 359-8092

BOB,

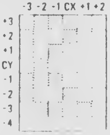
The machine language programming has taken me 3½ months of hard work to master. I can now generate a user-defined character and move it around the screen 3 times faster than printing a letter, and 16 times faster than using a box (or boxes) in which the speed is affected greatly during program execution. Those who wanted to roll a bowling ball can now do it using my tutorial on the character generator which I plan to have out late March.

Tim Hays

4 SIDED TRIANGLE
(PYRAMID)
3-D



This grid can also be used for drawing lines by using the "coarse" CX and CY values then adding or subtracting the needed amount to position the line exactly as you want it
Use the example cell to the right



This example cell is shown 2.5 times scale size.

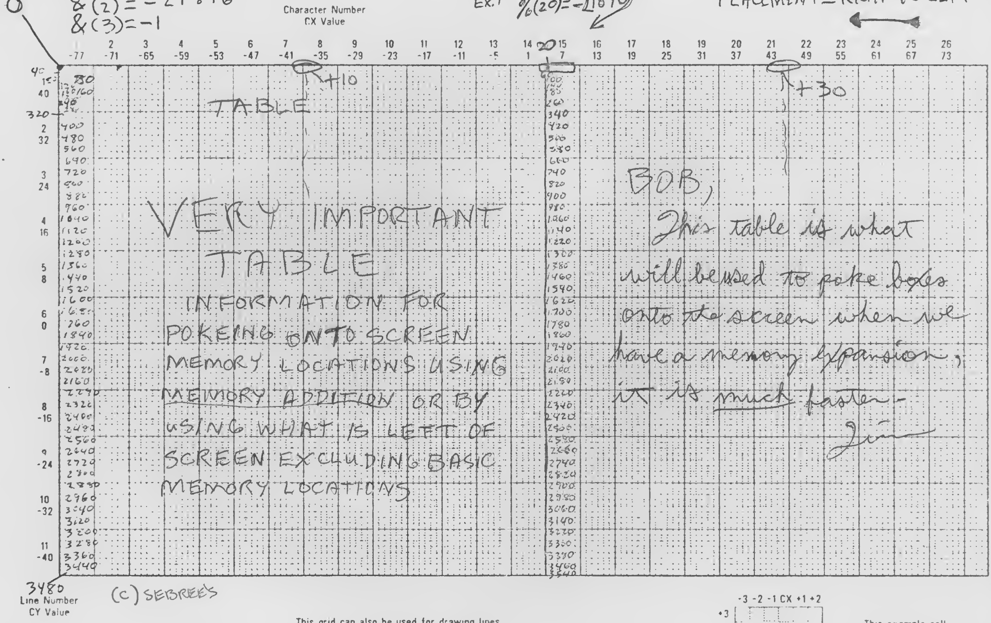
Notice that no pixels are used along the right and bottom border

SCREEN RAM POKEING LOCATIONS

&(0)= 0 LOCATION
&(1)= 21845
&(2)= - 21846
&(3)= -1

EX.1 %(20)=-21846

PLACEMENT= RIGHT TO LEFT



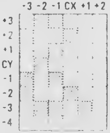
TABLE

VERY IMPORTANT
TABLE
INFORMATION FOR
POKEING ONTO SCREEN
MEMORY LOCATIONS USING
MEMORY ADDITION OR BY
USING WHAT IS LEFT OF
SCREEN EXCLUDING BASIC
MEMORY LOCATIONS

BOB,
This table is what will be used to poke boxes onto the screen when we have a memory expansion; it is *much* faster -
Jim

(C) SEBREE'S

This grid can also be used for drawing lines by using the "coarse" CX and CY values then adding or subtracting the needed amount to position the line exactly as you want it. Use the example cell to the right.



This example cell is shown 25 times scale size

Notice that no pixels are used along the right and bottom border.

COLOR DISPLAY PROGRAM (POKEING)

PUTS UP 5 COLORS WHICH CAN BE CONTROLED
AND CAN BE MOVED AROUND. (RIGHT&L. OR UP&D)
THIS IS JUST A ROUGH DISPLAY ↓

(C) Sebree's Computing
456 GRANITE AVE.
MONROVIA, CA 91016
(213) 359-8092

```
        1 NT=1
        5 CLEAR
        10 &(9)=12;BC=0;&(0)=0;FC=135;&(1)=102;
           &(2)=199;&(3)=8
L. CENT 20 FOR A=1894 TO 3054 STEP 40;FOR B=1 TO 9;
           %(A+B)=-21846;NEXT B;NEXT A
S.CENT. 30 FOR A=2178 TO 2738 STEP 40;%(A+2)=-1;
           %(A+1)=-1;%(A)=-1;NEXT A
LEFT    40 BOX -50,-18,36,30,1
RIGHT   60 FOR A=1907 TO 3069 STEP 40;FOR B=1 TO9;
           %(A+B)=21845;NEXT B;NEXT A
        65 FOR A=1 TO 14
        70 FC=RND(32)x8-1;&(1)=FC+64;&(2)=
           FC+128;&(3)=FC+33
        80 FOR B=20 TO 40;MU=B;NEXT B;NEXT A
        90 FOR A=1 TO 20;&(9)=40;MU=A;&(9)=
           15;NEXT A
        95 &(2)=FCxRND(8)
        100 FOR A=1 TO 21;TV=13;NEXT A;RUN
```

L.I.B. = 20180
20283

STACK = 20284
20462

T.I.B. 20002
20049

20200 TO 20258

MACHINE LANGUAGE LISTING
FOR STAR FIRE CHARACTERS

31.9 seconds to
load Data (60 BYTES)

DECIMAL	HEX
%(20200) = -43	D5 FF
%(20202) = 6965	35 16
%(20204) = 10240	00 28
%(20206) = 20210	F2 4E
%(20208) = -13871	D1 C9
%(20210) = -1936	70 F8
%(20212) = -32690	4E 80
%(20214) = 15104	00 36
%(20216) = 2432	80 09
%(20218) = 527	0F 02
%(20220) = -247	09 FF
%(20222) = 8782	4E 22
%(20224) = 16640	00 41
%(20226) = 18688	00 49
%(20228) = -27648	00 94
%(20230) = -5248	80 EB
%(20232) = -27520	80 94
%(20234) = 18816	80 49
%(20236) = 16640	00 41
%(20238) = 8704	00 22
%(20240) = 768	00 03
%(20242) = 8064	80 1F
%(20244) = 14034	F0 36
%(20246) = -40	D8 FF
%(20248) = -15618	FE C2
%(20250) = 1926	86 07
%(20252) = 2240	C0 08

TV=31; TV=31;
Print "Clear"; Print "y=20200 ; clear";

%(20254) = 32	20
%(20256) = 0	00
%(20258) = 0	00

PROPRIETARY

(C) SEBREES

```
%(20254)= 32     |  20  00
%(20256)=  0     |  00  00
%(20258)=  0     |  00  00
$(21)=255        |
:RETURN;RUN      |
```

MACHINE LANGUAGE

58 BYTES

%(20180)= 20238

20180	(-43)
81	13823
82	53
83	0
84	10240
85	-8664
86	20190)
87	-11954
88	-13871)
89	28873
90	-7056
91	20196
92	-32434
129. %(20213)=129	128
94	13056)
95	-32717
96	3968
97	2319
98	521)
99	2306
200	-5367)
201	20203
202	8782)
203	34
204	16640)

205 65
18688)
73
-27648)
-32620
-5248)
-32533
-27520
-32620
18816)
73
16640)
65
8704)
34
768
-32765
8064)
-4065
14064
-10186
-40)
-257
-15618)
-31038
1926)

-16377
2240
8200
32)
0
0
0

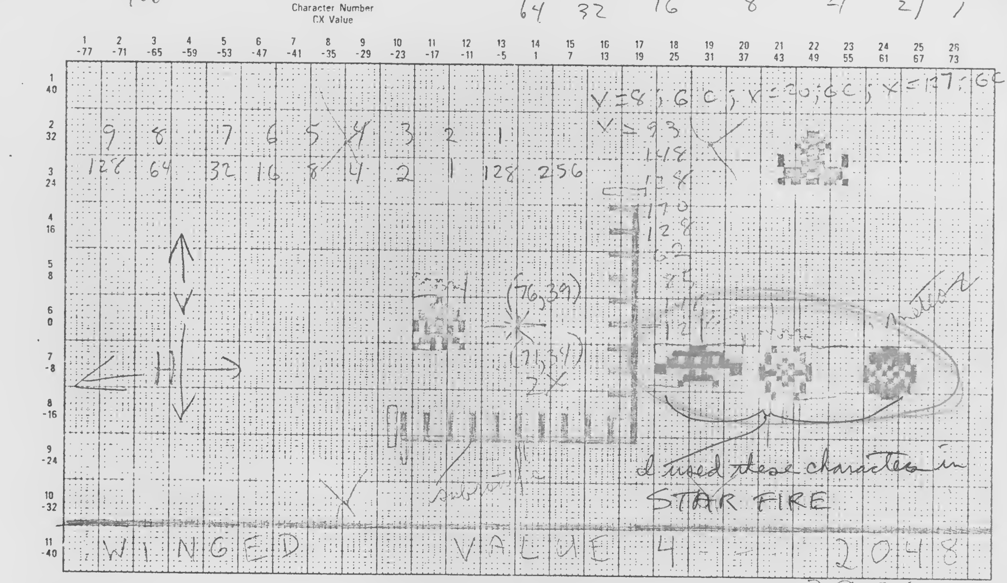
17408

(0)SC

```
199 :PRINT [illegible]
200 FOR [illegible] 0-[illegible]
210 PR[illegible]
220 NEXT S
```

SZ=499
488

1	0	-1	-2	-3	-4	-5	-6
128	256	512	1024	2048	4096	8192	16384
	64	32	16	8	4	2	1

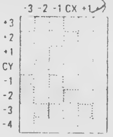


Line Number
CY Value

32767
?

30Y 0,5,157,77,2

This grid can also be used for drawing lines by using the "coarse" CX and CY values then adding or subtracting the needed amount to position the line exactly as you want it. Use the example cell to the right.



This example cell is shown 2.5 times scale size

Notice that no pixels are used along the right and bottom border.

THOM/AJARC4DIANS FORM 21A) 16MAR79

%(20200) = -43
6965
10240
20200 → 20210
-13871
112
20216
128
128
9
15
2
9
20223
34
65
73
148
20230 128
235
128
148
128
73
65
34
0

-43
6965
10240
20210
-13871
-1936
-32670
12800
2432
527
-247
8782
16640
18688
-27648
-5248
-27520
18816
16640
8704
768
8064
14064
-40
-15618
1926
1152 2240

32
0
12800

29 bytes - dual

%(20200) = -43

202 = 53

10240

20210

-13871

210 -7056

-32690

13056

3968

521

220 -5367

8782

16640

18688

-27648

-5248

-27520

18816

16640

8704

20240 768

8064

14064

-410

-15619

250 1926

2240

20254 32

56 0

58 17408

```
199 ; Print ; TV=13; TV=13
200 FOR S = 20180 TO20238
STEP 2
210 PRINT#1, "%(", S+20,
")=", %(S)
220 NEXT S
```

	128	64	32	16	8	4	2	1	128	
X				x	x	x				28,0
X			x	x	x	x	x			62,0
X		x	x	x	x	x	x	x		127,0
X	x	x	x	x	x	x	x	x	x	255,128
X	x	x	x	x	x	x	x	x	x	255,128
X	x	x	x	x	x	x	x	x	x	255,128
X		x	x	x	x	x	x	x		127,0
X		~~x~~	x	x	x	x	x	~~x~~		62,0
X				x	x	x				28,0

FOR 2ND CHAR TABLE
LINE 120 X=129;GOSUB B
140 X=129;GOSUB C

299 change the character

PRG. #2
changed
270

20184
%* 10240) change 1 bit for 2X
10.240

2X# } 0 X=28624;GOSUB C

128
32
8
2

128

table
for Bowling ball
character

7 6 5 4 3 2 1 0
0 1 0 J c c c
128 64 32 16 8 4 2 1

1 DS H

2 FF H
3 53
8 4 Hor IZ
5 Vert

% (20193) =
> 128
(VERT X 256 + HORIZ)
%(20185) = VERT

PARAMETER
6 . Character display param color use 0 or 2
7 Address of
8 Character String
20190
9 80 setup character table address 20195
10 1280 First character
11 CO LAST CHARACTER
11.5) SPACE 1BYTE

20195 ⑫ Character spec table
13) 1280 Subtract From Char to Get Table Address
14) Horizontal size
15) Vertical size
16 (Horizontal size-1)/8 +1
17) Vertical size x ((Horizontal size -1)/8 +1)
18 ADDRESS of Character table
↓

20184 = char. table start

17'8

add 1 to subroutine #

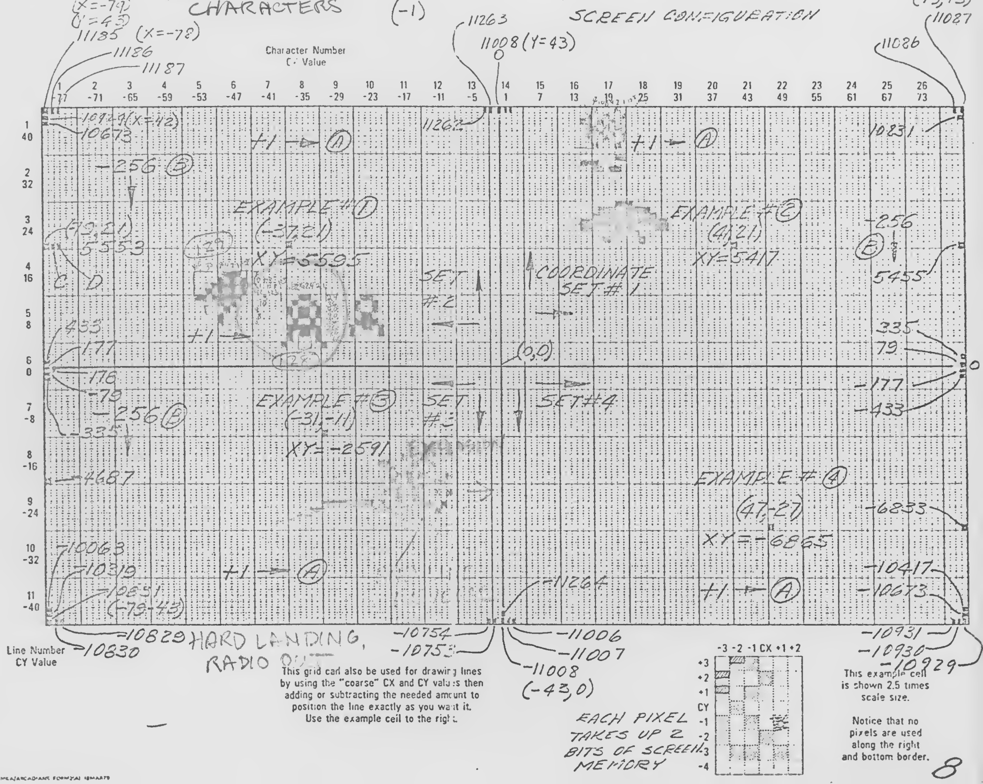
Decimal to hex

```
                        1005 clear
D5 save pointer         1010 A=20180; B=A; C=1080
FF call sub             1020 X=-43; Gosub C
53 subroutine #         1030 X=12371; Gosub C
30 horizontal pos       1040. X=-13288; Gosub C
18 vert                 1050 X=-13871; Gosub C
CC back color
Display monitor         1070 Call B; STOP
5 secs.                 1080 %(A)=X; A=A+2; Return
D1
C9
                                           00   02
                                           multiple subrt. call,
                        CC 11001100
```

```
subroutines  Manual assembler 16385 =
14           10 clear
16           20 @(0)=243; B=1
200          30 Print #1, !16384+B, "=", ; INPUT ""
             @(B)
             40 IF @(B) < 256 B=B+1; Goto 30
             50 @(B)=118                          130 : Return; STOP
             60 C=B
             70 INPUT W
             80 : Print
             90 for B=0 TO C
             100 TV=@(B); FOR D=1TO8; NEXT D
             110 NEXT B
             120 FOR B=C TO 128; TV=118; FOR D=1TO
             8; NEXT D; NEXT B
```

MOON LANDING CHARACTERS (-1)

XY TUTORIAL SCREEN CONFIGURATION



This grid card also be used for drawing lines by using the "coarse" CX and CY values then adding or subtracting the needed amount to position the line exactly as you want it. Use the example cell to the right.

This example cell is shown 2.5 times scale size.

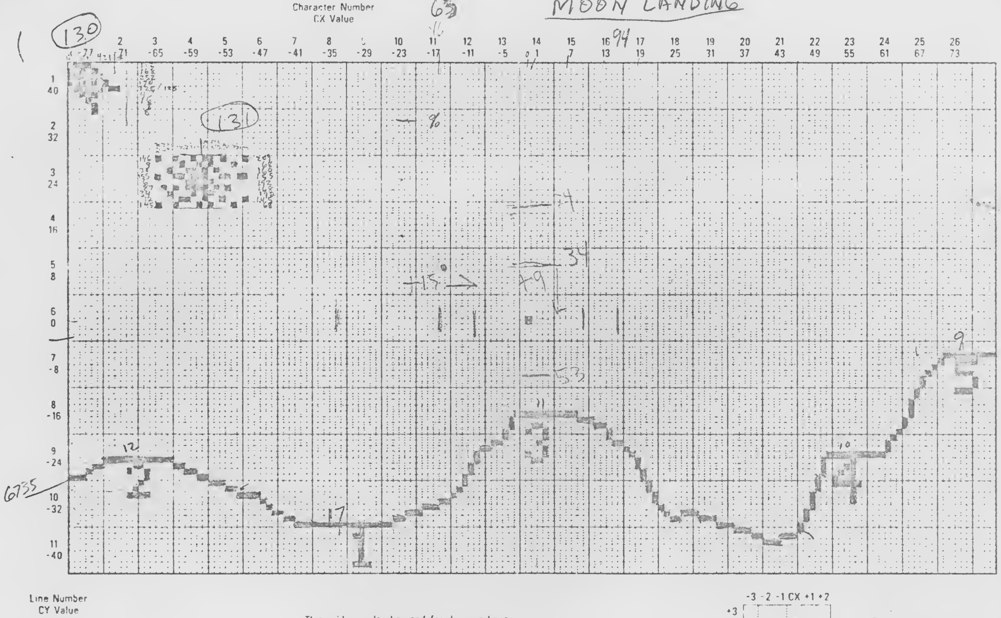
Notice that no pixels are used along the right and bottom border.

A

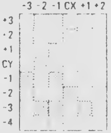
LOOP

57.9 seconds To load machine language

MOON LANDING



This grid can also be used for drawing lines by using the "coarse" CX and CY values then adding or subtracting the needed amount to position the line exactly as you want it Use the example cell to the right.



This example cell is shown 2.5 times scale size.

Notice that no pixels are used along the right and bottom border.

BOB, OK TO PRINT IN ARCADIAN
TH
WIERD!

BIG LETTERS

```
1 CLEAR ;.WIERD!
10 @(1)=97;@(2)=87;@(3)=73;@(4)=69;
  @(5)=82;@(6)=68;@(7)=33
40 INPUT "LETTER SIZE?"L;CLEAR;BC=0;
   FC=134;&(10)=140;CY=-30;FOR A=1 TO 7;
   TV=@(A);NEXT A
45 &(16)=100;&(21)=79;&(22)=255
50 NT=0;FOR X=-80 TO 160÷L-80;FOR Y=
   -33 TO -27
60 IF PX(X,Y)BOX (X+81)×L-79,(Y+30)×L,L,L,1
65 D=RND(3)+16;&(D)=RND(150)+10
70 NEXTY;NEXTX
80 BOX -59,-30,42,9,2;&(10)=174;&(22)=0;
   &(21)=0
```

SEE IF YOU CAN FIGURE OUT HOW THIS PROGRAM DOES WHAT IT DOES JUST BY LOOKING AT IT. SOMEWHAT LIKE THE BIG LETTERS ~~EAST~~ PROGRAM IN VOL 2 #3 BY PHIL MORTON, BUT IT DOESN'T PRINT THE SAMPLED LETTERS AT THE TOP OF THE SCREEN. T.HAYS

enter and print

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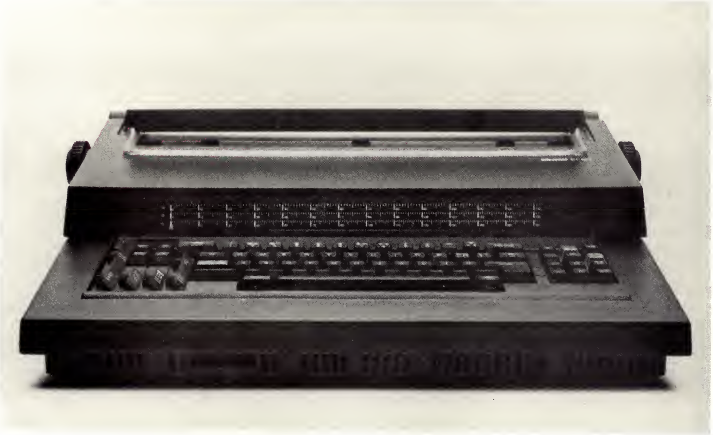
with Quadra-Pitch*



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*** 10, 12, 15 PITCH
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CHECK THESE FEATURES . . .

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  - Number of lines till end of page
  - An existing error condition
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- Signal light indicates when in auto-indent mode
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- Allows line feed without carriage return
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